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Published by THE PENTON PUBLISHING CO., Penton Bldg., Cleveland 13, Ohio, E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President and General Manager; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $6; two years $10; all other countries, one year $12. Single copies (current issues) 25c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.


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# STEEL

*The Magazine of Metalworking and Metalproducing*

VOL. 119, NO. 7 AUGUST 12, 1946


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Efficient Large Volume Job Plating
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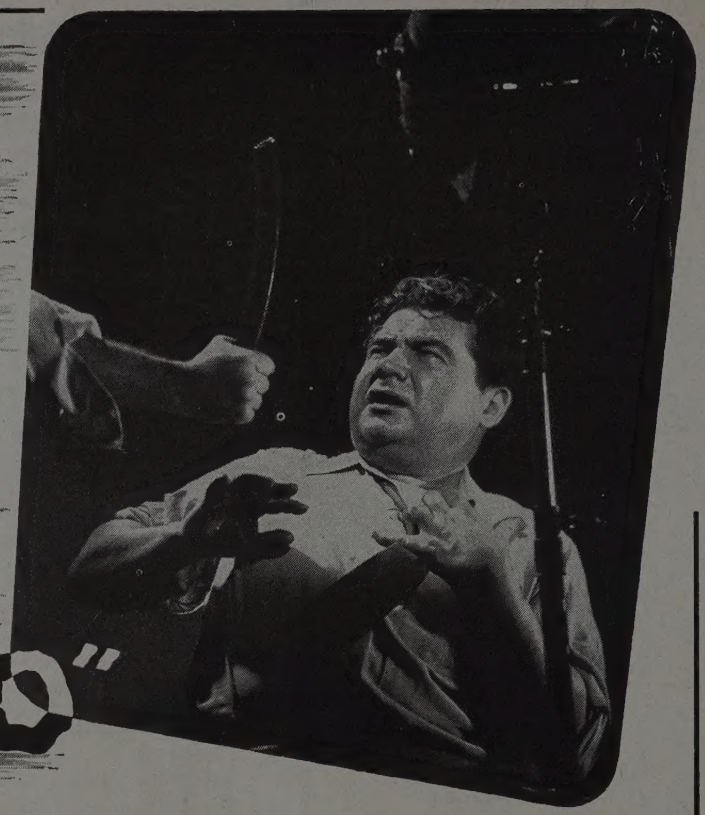
Properties of Lime-Ferritic Electrodes
Pipemaker Starts Large Improvement Program

# SOMETIMES IT'S A BIT DIFFICULT TO SAY.. "NO"



A few weeks ago we startled motor-hungry industry with our promise of good delivery on Welco *Special Torque Motors.* Since then, we've been begged, wheedled, propositioned and threatened by folks wanting us to build standard motors.

Our answer has to be "no" — and here's why.

We have no mass production line. Our workers are all highly-skilled technicians in the art of developing and building special motors. Material supplies are still critical. Our customers' requirements for Welco Special Torque Motors demand that we concentrate raw materials on the type of service that we have always offered.

That's our story, and for special motor users it will continue to have a happy ending.

## THE B. A. WESCHE ELECTRIC COMPANY

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As the EDITOR VIEWS the NEWS

# Antidote for Frustration

Wednesday, Aug. 14, marks the first anniversary of the surrender of Japan, formalizing the end of the world's most devastating war. A year ago, the victors were rejoicing in their victory and looking forward to the blessings of peace. Today, after a year of disappointment and confusion, victors and vanquished alike still are awaiting the first signs of progress toward the establishment of world harmony.

Looking back, it is not difficult to understand why there has been so much frustration and so little accomplishment. The job of mending the broken world has proved to be more formidable than anticipated. Even now, not one in a hundred of well informed persons realizes the importance or the complexity of the problems involved.

Secondly, neither the citizens nor the government officials of any nation were prepared for rehabilitation on a global basis. The minute the fighting stopped, the bonds that held nations together during war were loosened automatically—largely because of the instinctive desire of man to regain individual freedoms he had relinquished in wartime.

This leads to a third point. It has to do with fundamental concepts of government. On one side are those who advocate an all-powerful state which plans the life of the individual almost to the last detail. On the other side are those who favor a minimum of government regulation and a maximum of individual freedom.

The task of putting the world on its feet calls for planning on a vast scale. It encourages—for an indefinite period—a type of planning by strong governments which deprives the individual of his rights. That is why this first anniversary finds less individual liberty throughout the world than at anytime in centuries. It explains why planners, many of whom have failed in planning locally, are achieving so little in their attempts to plan globally.

One result of this is an almost complete blockade against individual effort in the work of mending the world. In scores of countries intelligent leaders impatiently await the time when they can call upon private engineers and equipment manufacturers to help them restore their economies. Millions of people are idle waiting for negotiations at diplomatic levels to clear the way for action by private initiative.

The great need of the world today is action by government officials that will permit people everywhere to enjoy again the benefits derived from the abilities, ingenuity and resourcefulness of private enterprise—acting without undue restrictions by too-powerful governments.

STEEL
August 12, 1946

**STRAWS IN THE WIND:** While it will be well to keep one's fingers crossed until more positive evidence develops, there are signs that the reckless era of "something for nothing" may have passed its peak.

The President talks more positively about economy in government. Some of his recent appointees as economic advisers are men of sound judgment. Threat of domination of labor unions by communists is not as acute as it was six months ago. Influential leaders in CIO and AFL are concerned about the low productivity of labor and are preparing to do something about it.

These straws in the wind represent an undercurrent of sober thinking which may herald a consciousness on the part of the people that it is time to quit blowing off steam, to get down to work and to take onto one's self responsibilities that recklessly have been shoved onto the shoulders of an all-too-willing paternalistic government.

This return to sanity, if and when it materializes, has been long overdue. It was to be expected that a letdown would occur after victory was won, but there was no excuse for economic nonsense to run

(OVER)

unchecked for an entire year. It has cost the nation dearly.

If realization of its terrific cost now spurs us to more earnest endeavor, it may be possible—even at this late date—to retrieve some of the needless losses.

• • •

**DEMAND IS DECEPTIVE:** One of the most difficult current problems confronting manufacturers in the metal working field is that of gaging the market potentials for their products.

Consider the case of fractional horsepower motors. It is expected that demand will exceed supply through 1946 and well into 1947. However, it is known that present order backlogs are deceptively high, due to extensive duplications in bookings.

A somewhat different situation obtains in the steel container field. Here demand also exceeds supply, but the true situation is obscured by the fact government restrictions on the use of cereals by brewers has reduced the demand for steel beer barrels to an extremely low level.

These abnormal factors which tend to expand or diminish market prospects artificially play havoc with a manufacturer's plans for postwar activity. That is why it will be good business for him to assign the best talent available to realistic analyses of long-term market possibilities. —pp. 46, 48

• • •

**WHO RUNS THE ROADS?** Because of recent ordering of freight cars by railroads, the government is trimming its tentative program for placing orders for 50,000 cars down to 40,000 cars.

This bit of news raises a question as to why the government should be ordering cars. Why should it assume a function that properly belongs to the management of the roads—particularly in peacetime?

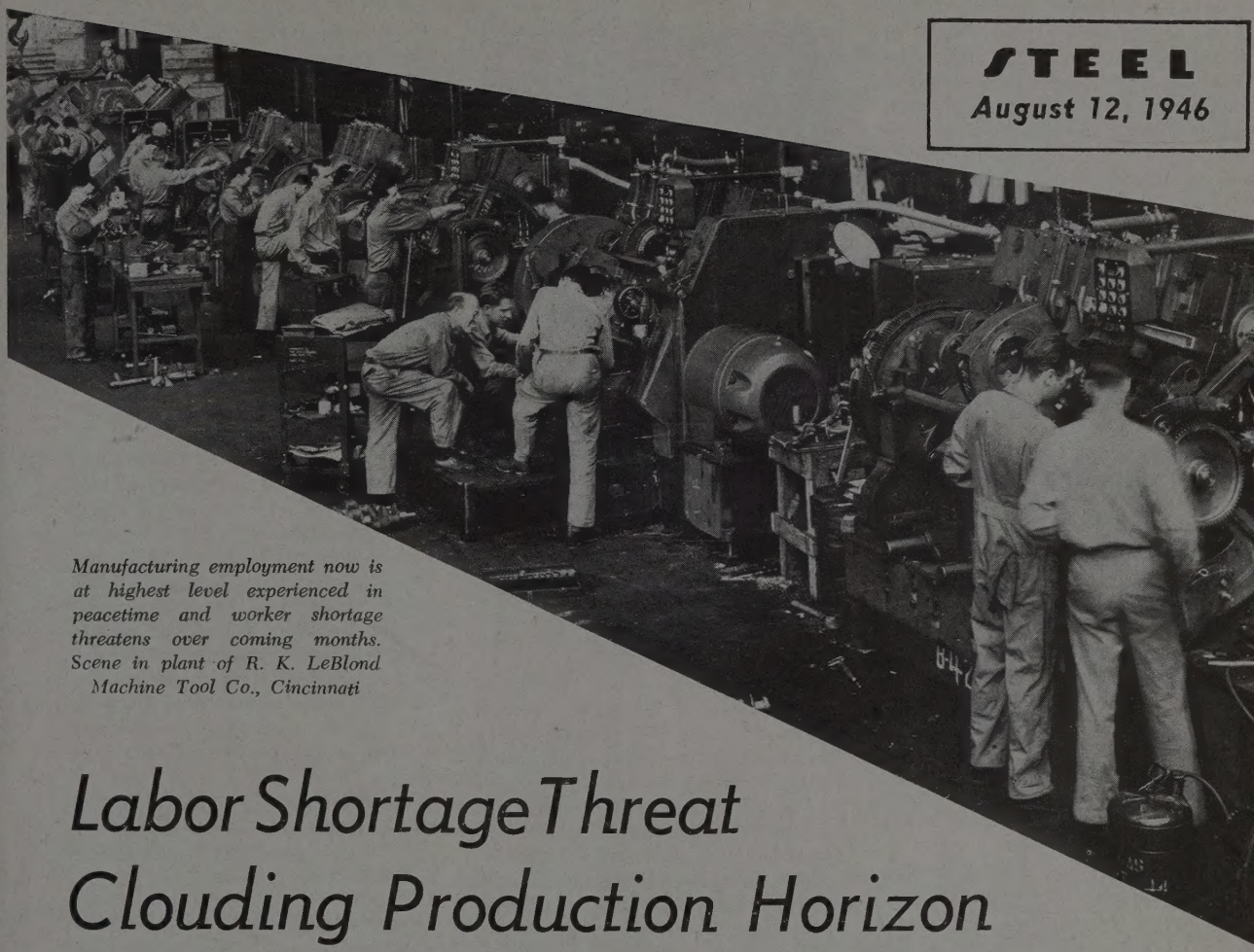
The answer, of course, is that the government continues to act as if the nation were still at war. It is being done simply because the end of the war has not been declared officially by executive edict. Is it proper that the government purchase cars on the slim pretense of the legal fiction that a state of war exists? Also, is a government agency spending public money or railroad management—responsible to owners for the wise use of their money—better qualified to act as purchasing agent? —p. 47

**SIGNS OF THE TIMES:** Informed opinion in Washington concludes that in signing the OPA extension bill, President Truman (p. 52) improved Republican rather than Democratic chances in this year's congressional elections. . . . Exports of British steel are to be reduced by about one-third during the third quarter in order to satisfy essential domestic requirements. The most urgent need of Britain's steel industry at the moment (p. 57) is an increase in the imports of semifinished steel for rerolling. . . . A check made in an automobile plant in Michigan (p. 59) showed that output per man is 45 per cent below that of 1941. . . . Welded locomotive boilers are being built on a regular production basis for the first time in United States railroad equipment history (p. 104) at the Schenectady, N. Y. works of the American Locomotive Co. . . . Prolonged strikes at the plants of two leading manufacturers of bolts and nuts (p. 51) are contributing to a serious shortage of these items which is beginning to be felt keenly by consumers in the automotive and railroad fields. . . . An interesting application of mechanical refrigeration has been introduced into the assembly line of a Detroit automobile plant. Steel valve inserts are chilled at minus 120° F., which shrinks them 0.002 in., permitting them to be inserted in place easily. At room temperature (p. 96) they expand and become firmly imbedded in the cylinder block. . . . United States Steel Corp. has asked for a reduction in freight rates from $12 to $8 per ton on steel moving from its Geneva Steel Co. mill to Pacific Coast consuming points. Leading industrialists are seeking approval of the lower rail rates (p. 65) in the belief that the downward revision would result in an increase in the number of new fabricating plants in the Pacific area. If the reduction is granted, other steel companies will seek comparable cuts in coastwise rail rates. . . . A new law, awaiting the President's signature (p. 54), would reduce by months or years the time required to settle damage suits in patent infringement cases. . . . The editors are pleased to present in this issue (p. 108) the first of a series of articles on hot dip galvanizing practice by William H. Spowers, Jr. The series will bring up to date the text of a book published eight years ago, which won wide acceptance as an authoritative treatment of this important subject.

E. L. Shaner

EDITOR-IN-CHIEF

STEEL
August 12, 1946



*Manufacturing employment now is at highest level experienced in peacetime and worker shortage threatens over coming months. Scene in plant of R. K. LeBlond Machine Tool Co., Cincinnati*

# Labor Shortage Threat Clouding Production Horizon

By WILLIAM M. ROONEY
*News & Market Editor, STEEL*

***Continuance of upswing in operations jeopardized by manpower difficulties. Dwindling reserves in skilled and unskilled categories indicated over coming months. Idle workers and unfilled job openings present paradox***

WITH manufacturing operations in many lines zooming toward unprecedented peacetime heights, continuance of the encouraging upswing in industrial production, experienced since the end of the major strikes, is clouded in doubt by a growing shortage of labor which threatens to become acute in many directions by fall.

Civilian Production Administrator John D. Small warns that later in the year manpower shortages in both skilled and unskilled categories may keep production below peaks otherwise attainable, pointing out that there are looming needs for 2 million additional workers in construction and manufacturing by the end of the year, and still unsatisfied requirements for labor in the service and distributive trades. Against these, he says, there was an unemployed pool of only 2.6 million in June (last month for which data are available) and a potential labor supply by the end of the year of less than 4 million.

Total employment in June hit the 57 million mark, a figure often set by government economists as the full employment goal. During the period March to June some 5 million workers were absorbed in the labor force and of this total 3 million went into seasonal agricultural expansion. Mr. Small estimates that possibly 4 million more jobs will have to be filled by the end of the year out of the 2.6 million unemployed in June, the drop-off in seasonal agricultural employment and the usual additions to the labor force.

In some divisions of the metalworking industry the labor supply situation already is acute with employment reaching new peacetime highs. Contributing to the difficulty is the high rate of job turnover and quits, and refusal of thousands of potential workers to accept employment entailing heavy manual labor and lower pay than they became accustomed to in wartime. At some manufacturing points the paradox of a plentiful supply of idle workers and jobs going begging is encountered. At these centers, there is enough idle manpower and womanpower, but plants are having trouble filling labor forces because workers are unwilling to start at "break-in" job levels. Also, thousands of returned veterans and former war workers prefer to draw unemployment compensation to accepting less attractive jobs.

As critical shortages of raw materials, such as copper and steel, are relieved, expectations are demand for certain classes of labor will far exceed available supply. As a matter of fact, had it not been for these supply scarcities, the acute labor shortages would have been felt weeks ago. Incidentally, many jobs are being declined because of fluctuating operations in many plants resulting from materials shortages.

Claims of many idle workers that

wages are not attractive are contrary to government wage data. Actually, American industry is paying record-breaking hourly wage rates. Average hourly earnings for workers in manufacturing industry reached a record high of $1.06 per hour in April and a further rise to $1.07 was indicated for May, the Bureau of Labor Statistics reports. The April average was one cent above the wartime peak set in January, 1946. Rising wage rates since the end of the war have offset in part the decline in "take-home" pay resulting from the shortened workweek. Average weekly earnings in April were $42.92, down only $4.50 from the wartime top.

Some relief in the labor shortage may be possible through an increase in worker productivity. The decline in worker efficiency through the war years has continued since V-J Day with some manufacturers reporting manpower productivity now at about the lowest point in years. Correction of this situation would help tremendously in offsetting the dwindling labor supply, and there is a slight chance that some constructive moves along this line may be taken by the labor unions in their effort to restrain price inflation by stimulating production. At any rate, that was the intimation that came out of the CIO strategy meeting in Detroit within the past month.

The situation in a nutshell is this: Demand for labor over coming months, both skilled and unskilled, promises to exceed supply. Demobilization of the military forces is slowing down, hence recruitments to the labor force from this direction will become increasingly lighter. Thousands of women war-workers are lost permanently to the labor force. Many thousands of presently-employed workers will leave their jobs to return to school after Labor Day. Expanding manufacturing operations with improvement in raw material supply will increase competition for available idle workers. On the constructive side there is the possibility worker productivity may increase, the actual reservoir of potential workers may swell substantially as unemployment compensation payments to idle workers run out, while shrinking bankrolls may force thousands now enjoying self-imposed idleness to become less selective in their attitude toward job offerings.

Summary of the manpower outlook as reported by STEEL's district editors follows.

### Manual Labor Jobs Scorned

**DETROIT**—The motor metropolis, with manufacturing operations continuing steadily upward, finds itself in the peculiar position of having an adequate supply of persons able to work, but an increasing shortage in types of persons willing to accept jobs of the heavy-industry type, requiring manual effort, and jobs requiring the higher skills. Auto plants hiring at the so-called "break-in" level are unable to locate enough help, even though manpower and womanpower is there, for the reason workers are unwilling to start at this level and move on up to machine operators' jobs.

EWAN CLAGUE

*Of Philadelphia has been nominated by President Truman as commissioner of labor statistics in the Department of Labor, a post vacant since the recent resignation of Dr. Isador Lubin. NEA photo*

Another deterrent to accepting jobs in automotive plants is the fluctuating production schedules, resulting from recurrent materials shortages, which reduce weekly take-home pay. Further, there is a general restlessness, particularly among returned veterans, which has resulted in labor turnover exceeding the prewar rate.

In spite of current difficulties, factory employment in the Detroit area set a new peacetime record on July 15, the industrial employment index of the Board of Commerce registering 134.6, against a peacetime high of 130.6 recorded on May 15, 1937. Wartime peak was 178.1. Mid-July also marked the first time this year factory payrolls have exceeded the levels of a year ago.—*A. H. Allen.*

### Acute Situation Threatens

**CHICAGO**—District employment is at highest peacetime level in history. Supply of workers is short of demand, the deficiency being pronounced in metalworking. By fall the situation may become acute.

Steel mills here are seeking to fill about 3300 jobs. Bulk of openings are in common labor, a classification hardest to fill. Turnover is considerable. In some instances, plants find quits exceed new hiring.

Metalworking and fabricating plants report in a similar tone. Shortage of materials has made for irregular employment with frequent layoffs and shorter than 40-hour weeks rather common. Improvement in supplies during the balance of the year is expected to smooth out schedules and to aggravate worker shortage.

Total employment demand is not sufficient to absorb the 135,000 workers currently unemployed, plus upwards of 50,000 returning servicemen who have entered the labor market.

Biggest demands are expected in iron and steel, electrical machinery and nonelectrical machinery. Despite the overall surplus, shortages of certain types of workers will grow more acute in the next few months as result of large-scale hiring. Major shortages exist for mechanical engineers, draftsmen, tool and die makers, sheet metal workers and buffers and polishers. Surpluses exist in accountants, chemists, general industrial clerks, welders, airplane mechanics, inexperienced machine and craft trainees and truck drivers.

Significant is a report of the "Men Over Forty Club" to the effect that jobs it is asked to fill exceed the number of men available.—*Erle F. Ross.*

### Demand for Skilled Workers Pressing

**NEW YORK**—Shortage of skilled workmen prevails in the metalworking industries here. Demand is well in excess of supply for pattern makers, polishers and platers, die makers, metal spinners and experienced draftsmen, among others.

Employment in the general metal and machinery industries is off fairly substantially compared with August a year ago. With August, 1945, serving as a base of 100, the index figure for June of this year was around 73 per cent, representing employment of approximately 175,000. These figures do not include certain miscellaneous lines. However, the trend of employment in metals and machinery is expected to expand again, as soon as materials and supplies begin to show appreciable improvement in volume. Overall industrial employment in New York city was down about 1 per cent for June as compared with the base period of 100 per cent in August of last year.—*B. K. Price.*

### Skilled Workers Scarce

**CLEVELAND** — Shortage of skilled workers has developed here and a scarcity of all types is expected soon. Present scarcity is confined principally to diemakers, machinists, molders, tool grind-

ers, sheet metal workers, bricklayers for the steel industry, and boring mill, turret lathe, engine lathe and milling machine operators. Supply of draftsmen, designers, stenographers, typists and office machine operators is practically "nil."

Employers will have to reopen "earn-as-you-learn" training programs within a few weeks in order to fill their labor needs, a USES official predicts. Employment in the district is only 12 per cent below wartime peak and is 22 per cent above that of April, 1940. It is pointed out that only 46,000 persons are now unemployed compared with a reasonable minimum of 25,000 out of a maximum labor force of about 617,000. More than 30 per cent of the men currently unemployed are veterans of World War II, and one-third of them lack the work experience necessary to fit them into an occupational category. About 22,000 of the idle are drawing jobless benefits.

The current level of employment represents a gain of 41,000, or 8 per cent, over the postwar low reached in September, 1945.—*F. R. Briggs.*

### Overall Supply Eases

**PHILADELPHIA**—While overall labor supply in the iron and steel and foundry industries continues to ease, there is a critical shortage of diemakers, floor and bench molders, experienced mechanical draftsmen, sheet metal workers and wire screen weavers.

Local district employment has increased since last May in the iron and steel and foundry industries by about 400 to 39,100. There has been a still greater increase in allied industries, employment in the automobile industry at the end of July amounting to 20,700, compared with 14,400 last May; the electrical industry has taken a spurt to 35,700, against 34,500; and the nonferrous metal industry to 7100, against 6700.

Although employment offices are in receipt of numerous applications (it is said that there are 17,000 applications for jobs in the metalworking industries, principally unskilled), overall activity in the district is high, with total payrolls involving 1,287,000 employees, against 1,078,000 in 1940, before the war. The present figure is even slightly higher than in July, 1945, when 1,279,000 were employed, and higher than in May, 1946, when the total amounted to 1,261,000.

Comparisons between July and May figures for this year must be considered in the light of the labor conditions which prevailed in these two periods, however. In July, labor strikes were at the lowest level since V-J Day, while in May there was considerable disruption in many lines not only because of the direct effect of strikes at various plants, but because of the indirect influences of the coal strike. At present it is believed that general industrial employment will continue to expand as materials become more freely available. Lack of supplies has proved an important restricting factor.—*B. K. Price.*

### Current Supply Adequate

**PITTSBURGH** — Except for a few skilled classifications the labor supply for steel producing and metalworking operations is adequate at the moment. However, should projected increased production schedules materialize, a labor shortage in certain skills may develop by fourth quarter.

Recent labor market developments show a beginning of a situation wherein there are on the one hand large numbers of unemployed veterans in a generally adequate overall labor supply, and, on the other hand increasing numbers of occupations in which there are shortages.—*J. C. Sullivan.*

### Demand Equals Supply

**SAN FRANCISCO**—Demand in the labor market here is now fairly equal with supply except for shortages of skilled clerical workers, craftsmen and repairmen. Unskilled labor supply is adequate in nearly every industry.

Many employers, however, report demand for labor would be greater except that they are hampered by shortages of materials and by continued uncertainties over business conditions and prices. These factors have tended to reduce operations. It is thought likely that when operations increase the shortage of skilled workers will become more critical.—*Robert Bottorff.*

### Jobs Go Begging

**BIRMINGHAM**—Many jobs are going begging in this area because thousands now idle prefer to stay on unemployment compensation rolls. Whatever labor shortage there is here is chiefly due to the fact hundreds of potential workers, men and women, are not anxious for work. For example, in Jefferson County there are 7511 veterans drawing $20 per week compensation and 3960 non-veterans getting state unemployment assistance.

The hitch is that the law stipulates "suitable" employment or employment at a job for which a workman is qualified must be provided if a job-seeker is to be denied compensation payments. Consequently, numerous job openings are ignored by the idle.—*R. W. Kincey.*

# Present, Past and Pending

### ■ SUBSIDIES ON IMPORTED METALS TO CONTINUE

WASHINGTON—Federal government's program for importation of scarce nonferrous metals, ores and concentrates will continue on the same basis that prevailed before the former price control law expired, Reconversion Director Steelman has announced.

### ■ ALUMINUM CO. BID FOR PLANT REJECTED BY WAA

WASHINGTON—War Assets Administration has rejected a bid of $5,500,000 from Aluminum Co. of America for the Cressona, Pa., plant and has offered to sell the plant to the company for $6,500,000 and to sell any machinery and equipment in the plant on a basis of 60 per cent of the installed cost.

### ■ VACUUM CLEANER SALES CONTINUE TO INCREASE

CLEVELAND—Factory sales of household vacuum cleaners in June totaled 161,631 units compared with 145,935 in May and 146,889 in June, 1941, last prewar full production year. Second quarter sales were 467,124 as against 469,377 in the like 1941 period.

### ■ WORTHINGTON PUMP GETS BIG COMPRESSOR CONTRACT

BUFFALO—Local plant of Worthington Pump & Machinery Corp., Harrison, N. J., has received a $3,250,000 order for gas engine compressors from Natural Gas Pipeline Co., Chicago. It will take the plant until late in 1948 to complete the order.

### ■ COOPER-BESSEMER ORDERS AT RECORD PEACETIME HIGH

MT. VERNON, O.—Demand for Cooper-Bessemer Corp. products continues at record peacetime high with unfilled orders on July 15 amounting to $13,131,000 compared with $9,434,000 on Jan. 1, according to B. B. Williams, chairman.

### ■ DETAILS OF WHEELING STEEL PLANT SALE REVEALED

WHEELING, W. VA.—Details of the sale of Portsmouth, O., plant of Wheeling Steel Corp. to Portsmouth Steel Corp. disclose that of the payment $3,800,000 was for the plant and $8,200,000 for inventories and working capital. Sales contract requires Wheeling to roll sheets for the new owners at its Steubenville works for a period of three years. In addition, Wheeling will purchase from Portsmouth a substantial tonnage of semifinished material in the same period and will continue temporarily the manufacture of range boilers in the Portsmouth plant.

# Shortage in Motors Seen Until 1947

***Manufacturers expect downward revision in orders by household appliance makers early next year. Production capacity expanded***

DEMAND for fractional horsepower electric motors will exceed supply through the remainder of 1946 and well into 1947.

This is the consensus of manufacturers who are fully cognizant of the probability that an adjustment in present order backlogs is likely early in 1947 when household appliance manufacturers are expected to revise their requirements downward.

Order backlogs for fractional horsepower motors currently extend into 1948. Larger units are available somewhat earlier, with deliveries extending 12 months.

Present order backlog for motors centers chiefly in the fractional horsepower classification, and is believed to represent considerable duplication in ordering. This is another factor which prompts manufacturers to anticipate a rejuggling of order backlogs early in 1947 when overall supply is expected to be more plentiful.

*Fractional horsepower motors move down the final assembly line at Plant 7, Jack & Heintz Precision Industries Inc., Cleveland*

### Record-Breaking Production Seen

Expansion programs now being carried out by leading interests, plus the entry of a number of new companies into the field of electric motor manufacture, will make possible record, breaking production by early next year, and gradually will bring output into closer balance with requirements. A leading interest, for example, has established production schedules for late this year equivalent to three times normal peacetime output, made possible by a large expansion program nearing completion.

Even though electrical motor requirements for household appliances are not expected to reach the volume earlier forecast, demand from these sources is expected to substantially exceed prewar sales throughout 1947. In addition to these requirements, it is pointed out that the rural electrification program is expanding rapidly, which in turn will result in increased motorizing of farm equipment such as hoists, feed grinders, etc. Most of these motors fall into the fractional horsepower category.

Another expanding need for electric motors is indicated for machine tools. To obtain a wider range and also more flexibility and better control of feed drives, tool builders are relying to a greater extent on small direct current motors, extending also into larger integral units.

Commercial refrigeration, room coolers, and deep freeze units also are expected to take a large volume of the electrical motor production over the coming months, extending beyond the fractional horsepower units up to 300 horsepower. However, the biggest market is in the fractional horsepower units up to 5 horsepower.

Production of electrical motors currently is well below capacity due to acute shortage of copper wire coils, cast iron brackets and electrical steel sheets, and no significant improvement in these items is indicated through this quarter. Manpower shortage is not a major factor retarding production at the moment, although most manufacturers are badly in need of engineers and draftsmen.

## Furnace Manufacturers To Get Priority Assistance on Motors

Civilian Production Administration will announce soon a new priority plan under which "CC" ratings will be issued

to warm air furnace manufacturers to help them obtain components. This step is being taken because about 50,000 furnaces were shipped without motors during the first half of the year despite apparently adequate production.

Production of electric motors suitable for heating units was well in excess of originally estimated requirements for the period, CPA officials reported. Production of this size of fractional horsepower motor was 101,000 units, compared with an indicated need for 88,000 units. Outlook for the last six months of 1946 points to a "paper surplus" of 75,000 motors, but based on previous experience it appears that some priority aid is required by the furnace producers to assure them that sufficient motors will be "set aside" to meet housing needs.

One of the principal reasons for the diversion of electric motor production to less essential needs is the wide variety of uses for fractional horsepower motors.

Although the industry appears to have overcome the production problem for housing needs, motor manufacturers generally will continue to be plagued with materials shortages during the fourth quarter of this year. Shortages of copper magnet wire for armatures, castings for motor blocks, steel wire for screw bolts and electrical silicon sheets will continue in short supply for some time in the future, according to CPA officials.

## Foremen Unionization Case Reaches Court

Industry's fight against unionization of its supervisory employees moved into the United States Court of Appeals for the District of Columbia last week when Jones & Laughlin Steel Corp. asked the court to restrain the government and John L. Lewis from putting into effect a contract for its 136 supervisory workers in captive coal mines.

The Jones & Laughlin case is considered by the coal industry as a test on unionization of supervisors.

Jones & Laughlin's coal mines, along with those of other producers, were seized May 22 after a 51-day strike. A contract between the coal mines administrator, Admiral Ben Moreell, and the United Mine Workers was signed July 17 which covered supervisory workers as well as production workers.

Jones & Laughlin contends that its foremen should not have to join the union, despite the fact that the National Labor Relations Board has certified the UMW as collective bargaining agent for the foremen. Company counsel claimed the NLRB certification should have no enforcement until after judicial review.

# Government Revises Freight Car Buying Program to 40,000 Units

***Action follows flurry of ordering by carriers on own account. Approximately 35,000 cars requiring 550,000 tons of rolled steel and castings now on order. Labor conditions at car shops much improved***

*NEW YORK*

FREIGHT car demand is fairly active, with recent orders including 1000 fifty-ton box cars for the Union Pacific, placed with the Pullman-Standard Car Mfg. Co., Chicago, and 400 fifty-ton gondolas for the Delaware & Hudson, placed with Bethlehem Steel Co., Bethlehem, Pa.

In fact, recent buying has been sufficient to cause the government to revise its tentative program for the placing of 50,000 freight cars to 40,000. However, there is still question as to whether the government will go ahead with any such program. Trade interests regard talk in government circles as being serious enough, but are confident that Washington would quickly drop the idea of such a program if it appeared the railroads themselves would undertake the buying. The railroads would first like to obtain assurance from the Interstate Commerce Commission of still higher freight rates; nevertheless, they may go ahead without such assurance on at least a portion of this program, as recent buying would appear to indicate.

### Concerned About Priorities

Meanwhile, producers of car steel are somewhat concerned over the possibility of the setting up of priorities for domestic car equipment. They estimate that the approximately 35,000 or so freight cars now on order would require more than 550,000 tons of rolled steel and castings, to say nothing of such additional requirements as may develop as a result of further car buying.

However, if car steel were put on a priority basis it possibly would be limited only to such cars as might be completed before the end of the year and just how much that would amount to producers cannot say. Further a certain portion of the steel required for the domestic cars now on order is on hand at the car shops, and undoubtedly too directives which may be issued would cover no little tonnage already on order and likely scheduled for early rolling. Nevertheless, anything new in the way of directives on car steel would in all probability impose at least some burden on the mills, along with considerable re-shuffling of schedules in certain instances.

There is little question but what the 35,000 domestic cars or so now on order could be finished by the end of this year. Car shops should have steel on hand for fabrication at least 60 days in advance of assembly, and a certain amount of these requirements are already on hand, but certainly not all. Labor conditions at the car shops are now the best they have been in a long time and assuming the builders will be able to obtain the raw materials necessary—lumber and other supplies as well as steel—they might likely be able to turn out such a program. But, as some trade leaders declare, there are still "a lot of ifs."

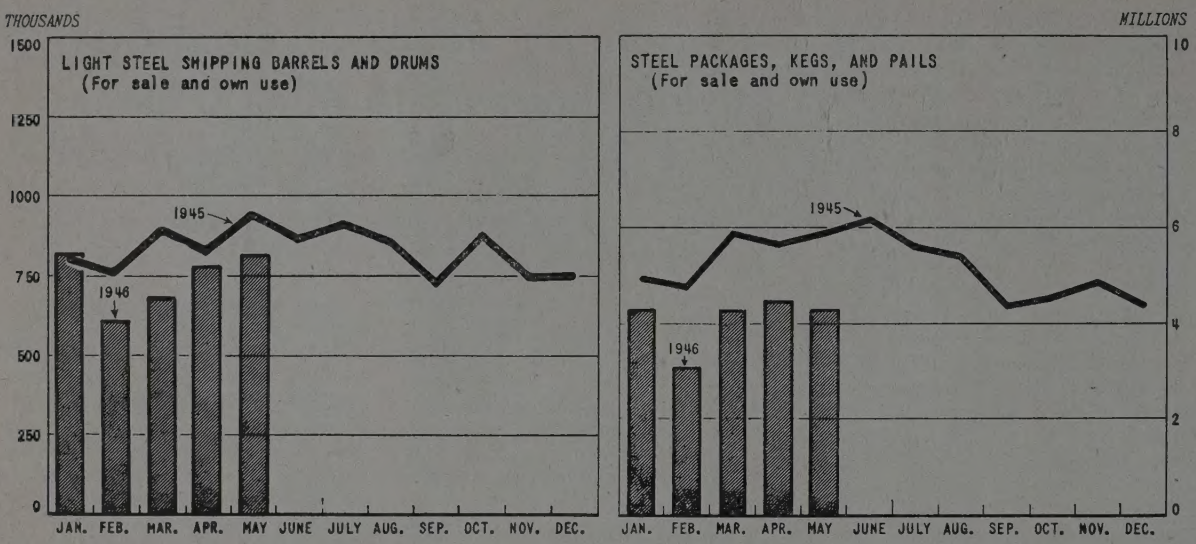
During the first seven months of this year car shops turned out only 22,500 cars. However, this rate of production is no criterion of what the car builders might be able to do in the future, for the reason that they suffered severe handicaps during this period, principally because of the badly disturbed labor situation which prevailed, not only in their own shops but in the plants of their suppliers.

In addition to domestic backlogs, it is estimated that there are close to 45,000 cars on order for export, including especially 36,000 cars in urgent need by the French government. However, should ratings be imposed they would very likely apply only to steel needed for urgent domestic necessities. Incidentally, the French program, already set back many weeks, may get off to a modest start in September. There are certain shops, with French cars on order, which now have some of the necessary steel and other material on hand and consequently will soon be in position to start assembly.

## Railroad Rolling Stock in Finland Needs Replenishing

Finnish rolling stock was badly depleted in the war years, according to a report on that country's railroads made to the Department of Commerce.

There is a 30 per cent reduction in number of freight cars, from prewar, and a daily shortage of 2,500 to 4,000 cars exists. Also, the report added, out of 745 locomotives in use, 100 date from prior to 1900 and nearly 20 per cent are undergoing repairs at all times.




*Production of light steel shipping containers in 1945 and first five months of 1946*

# Seek Steel for Containers

***Manufacturers step up production but output is 20 per cent below that of year ago due to metal shortage. Resumption of steel beer barrel output on large scale hampered by many obstacles including restrictions on use of cereals by brewers***

By F. R. BRIGGS
*Associate Editor, STEEL*

PRODUCTION of steel shipping containers is increasing steadily from the low levels reached during the first five months of this year when work stoppages in the coal, steel and other vital industries interrupted scheduled shipments of raw materials. Producers are receiving larger shipments of steel from the mills and are stepping up their operations proportionately.

Although production is nearly 20 per cent under the rate prevailing a year ago, it is still high compared with the prewar rate and should be even higher to satisfy the pressing demands of the consuming industries. The principal users of shipping containers, including the oil, paint and chemical industries, were forced to use reconditioned containers for normal needs during the war years since practically all new units were required to move war materials. These consumers are now anxious to replenish their stocks. Some shippers had shifted to the use of other types of shipping containers during the war period and many of them now wish to return to the customary steel container.

The steel shipping container industry has been handicapped in stepping up its operations to meet this heavy demand by the steel shortages. As an indication of the types of steel which the industry requires, requirements in 1939 when the output was about 40 per cent below what it is today were about as follows: 384,000 tons of hot-rolled steel sheets, plates and strip (except stainless); 58,858 tons of cold-rolled steel sheets and strip (except stainless); 16,840 tons of black plate, 3666 tons of terne plate, and 1455 tons of tin plate. Stainless steel purchases aggregated slightly less than $200,000.

An average of 64 companies produced shipping containers during that year and employed about 6072 workers who were paid $7.4 million in wages. In producing products valued at $49,165,973, the industry purchased raw materials, supplies, fuel electric energy and contract work amounting to $32,328,346.

### Beer Barrel Production Slowed

These statistics do not include figures for the steel beer barrel industry which was becoming an important factor in the steel market just prior to the outbreak of World War II. The strong uptrend in the use of steel beer barrels was halted due to wartime conservation measures and the industry has encountered several obstacles in resuming active operations. In addition to the shortage of steel, production was adversely affected this spring by government restrictions on the use of cereals by the brewing industry. Breweries found themselves well stocked with barrels when their production was curtailed, resulting in the cancellations of many large orders for steel barrels. Further restricting demand for steel shipping containers, many of the breweries have withdrawn from the draft beer market, except for local deliveries, and are marketing their product in bottles. This latter development is attributed to the unfavorable price situation for the product delivered in barrels as compared with bottled goods.

Resumption of active demand for metal beer barrels is expected by the container industry as soon as government restrictions are lifted, or are at least modified. A complete shift to the steel barrel is unlikely, however, since competition with aluminum and wooden barrels must be met.

Due to sustained active demand from other industries, representatives of the steel shipping container industry have informed the Civilian Production Administration that increased amounts of steel sheets must be made available to them to assure adequate deliveries of many reconversion materials.

A CPA official pointed out, however, that the relatively short supply of steel sheets is general in all industries and that any effort to extend priorities aid would dislocate present distribution of the material without relieving the present shortage. "This situation is aggravated by the preferred requirements of the Veterans' Housing Program and the Famine Control Program which must be met first," Irving C. White, deputy director of the Bureau of Industry Operations, CPA, explained.

However, new rolling facilities are ex-

pected to be completed in the next six months which will materially relieve the tight situation in flat-rolled steel products. A 300,000-ton annual increase in steel sheetmaking capacity is expected to be completed by the end of this year. This new capacity, when installed, will lift total sheetmaking capacity to about 16 million tons annually and should be adequate to take care of essential needs, CPA representatives said.

The officials are now considering the recommendation that the needs of the container industry be reviewed with an attempt being made to channel more steel sheets for use in containers. It was estimated by an industry representative that container users are now obtaining only 30 to 35 per cent of their requirements.

Production of steel shipping barrels, drums, and pails declined slightly during May as the industry output totaled 1.9 million heavy type steel barrels and drums, 812,000 light type barrels and drums, and 4.3 million steel packages, kegs and pails, according to figures issued recently by the Bureau of the Census.

Unfilled orders for heavy types of steel barrels and drums increased and on May 31 amounted to 8.6 million, 9 per cent more than the corresponding figure at the end of April. Unfilled orders for the other types of shipping containers remained fairly steady.

## Canadian Steel Shortage Acute as Strike Result

*TORONTO, ONT.*

Canadian steel strike now is well into its third week and while there are reports from Ottawa regarding early settlement of the troubles, there is nothing definite to indicate the strike will be over soon.

Total suspension of shipments from the three big basic steel mills already has resulted in the throwing out of work of thousands of men due to the shortage of raw materials in plants that are not directly concerned with the strike in the steel industry.

The steel shortage in Canada has reached desperate proportions and many fabricating plants, foundries, and manufacturing concerns in general are facing shutdowns, either through shortage of steel or pig iron. The Steel Co. of Canada Ltd. continues to maintain production with upwards of 2000 employees housed within its grounds, while Algoma Steel Corp., and Dominion Steel & Coal Co., Sydney, N. S., are closed tight insofar as iron and steel production is concerned.

# Ship-Breaking Program Speeded To Alleviate Scrap Shortage

WHILE the scarcity of iron and steel scrap continues to impose a ceiling on steel ingot production, government and industry groups are intensifying efforts to increase the flow of scrap to mills. Twenty-five to 30 open hearths are reported to be idle as result of the scrap shortage, which has become so acute that some steel producers are devoting part of their national advertising to pleading for help in obtaining supplies.

One move which is getting underway to provide more scrap is an accelerated ship-breaking program. Civilian Production Administration has announced that 280 ships will be made available for early scrapping and will produce about 700,000 tons of material. However, some delay is being encountered in effecting this program, due to the necessity of conforming to Maritime Commission and Navy procedure of bidding, and industry observers believe that 45 days may elapse before the ships are allocated to breakers.

Selection of ship-breaking companies to handle the job, based on experience and ability, is the No. 1 problem.

All the ships will be scrapped at tidewater points. Cost of towing the vessels to inland ports, where possible, would be prohibitive. Practically all the vessels to be scrapped will be ocean-going ships. Most of the surplus Great Lakes carriers have been sold to Canadian interests.

The National Affairs Committee of the Institute of Scrap Iron & Steel Inc., which was appointed to consider the current scrap shortage, recently received a request from Edward W. Greb, who is directing the Civilian Production Administration's salvage campaign, for suggestions for alleviating the scrap scarcity.

At a meeting in Cleveland last week, the committee unanimously recommended that the institute's directors suggest to CPA and the Office of Price Administration several actions to be taken immediately by government agencies. Chief among these suggestions was for an increase in scrap prices.

*Crane hoists 6000-lb piece of steel in scrap preparation yard, preparatory to breaking and shipping to steel mill*

# British Tool Builders Advised To Use Credits Boldly To Restore Free Trade

***Pratt & Whitney's foreign sales manager suggests American loan should be used to bring back freedom to import. Points to uncertainty and delays in administrative procedure under present import licensing system***

BOLD use of the credits extended Britain in the American loan to facilitate the earliest possible attainment of unimpeded world trade was recommended to British machine tool builders, importers and allied trade representatives recently by Alexander S. Keller, vice president and manager of foreign sales, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn. Mr. Keller is making a tour of western Europe in behalf of his company and addressed a luncheon meeting of the Machine Tool Trades Association in London.

Mr. Keller endorsed a recommendation by the British association that freedom to import machine tools into Britain should be restored as soon as possible, and suggested that present regulations be liberalized to remove the uncertainty that confronts British importers.

"As we all know, there are many types of special machines which can be imported under present regulations. Present procedure, however, causes British industry unnecessary delays even in acquiring such machines. And the uncertainty as to whether or not a license is to be obtained must often make a purchaser arrive at a decision which is actually not in his own best interests or those of the nation. Administrative delays can often be a more serious difficulty than the regulations themselves.

"The American loan is ratified, and there was no group that supported it more earnestly or deplored its delays more sincerely than your colleagues in the American machine tool industry. Equally earnestly we hope that it will prove to be no mistake.

"Its purpose was to facilitate the earliest possible attainment of unimpeded world trade, and to help Britain reach a situation in which her export position will be so thoroughly restored that controls and restrictions can be finally abandoned. . . .

"If any British buyer of machine tools, or, for that matter, of any other type of capital equipment, is willing to pay the price and the transportation and the duty he must perceive an advantage in quality or productivity or delivery. If you can free yourselves of control in the importation of productive equipment, I am sure that any excess in the use of dollars over the amount allowable under present procedure will repay itself many times over.

"That, gentlemen, is what the loan was intended to do. Used timidly, it could not serve its purpose if it were many times as great. Used boldly, it can immediately free British enterprise to face up to the task that all the world needs as much as Britain. And it most surely can lead to the day when control, restriction and austerity are cold memories."

## Much Machinery Reported Sold At Lyons, France, Exhibition

**Washington**—A large volume of business resulted from the first postwar machinery exhibit at the Lyons, France, international fair, earlier in the summer, according to a report to the Department of Commerce.

Agricultural machinery makers were forced to decline many offers to buy models on display, but took orders for future delivery from a long line of customers. However, manufacturers did a considerable business selling 1940 and 1941 models of food-packing machinery in the absence of materials for manufacture of new models.

Large orders were also reported received for typewriters and calculating machines, and orders accumulated for textile machinery to an amount that exceeds the estimated total output for the next several years.

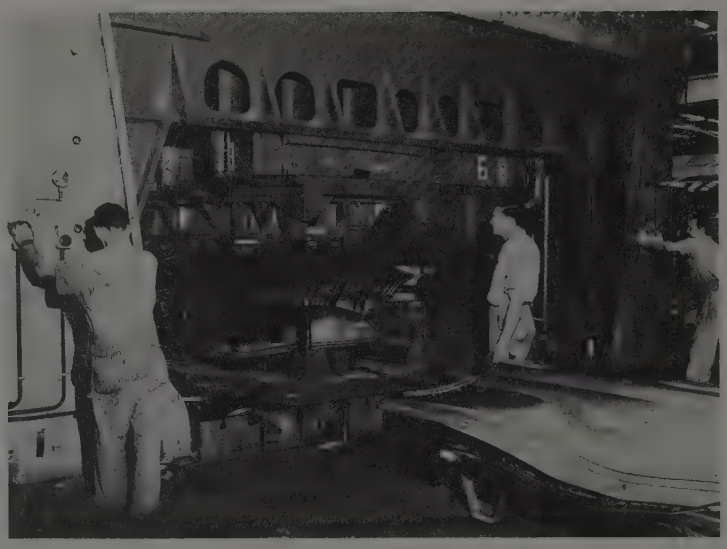
## Tool Plants Cutting Order Backlogs at Cincinnati

**Cincinnati**—New ordering of machine tools, especially for domestic needs, is at a fair level but most plants recently have reduced backlogs.

Production was resumed by the Cincinnati Bickford Tool Co. after settlement of a strike lasting 28 weeks.

## Not Much Headway Being Made On Tool Backlog at Pittsburgh

**Pittsburgh**—Despite drop in new orders not much headway is expected to be made against machine tool order backlogs this quarter, for there is little prospect of tool builders substantially stepping up output due to present acute shortage of steel and components.



WILLOW RUN PRESS: Body panels for the new Frazer and Kaiser Special automobiles are stamped out in one of the multiple-action presses now in operation in the Willow Run plant of Kaiser-Frazer Corp. Among the largest in the industry, some of the presses weigh 400 tons and tower 30 feet above floor level

# Strikes at Bolt and Nut Plants Threatens Consumer Goods Output

SHORTAGE of fasteners has reached a critical stage and now threatens to force a curtailment of consumer goods. The automotive, farm implement and household appliance industries are in an especially vulnerable position since their reserves, as well as those of their suppliers, are nearly depleted.

Users now must rely chiefly on current output to satisfy their needs and this has been drastically reduced during the past three months by prolonged strikes at plants of three of the major producers. No early settlement of these strikes is yet in prospect.

Work stoppages at two plants of Lamson & Sessions Co., Cleveland, have cut that large producer's output to about 55 per cent of capacity while strikes at plants of National Screw & Mfg. Co., Cleveland, and Buffalo Bolt Co., Buffalo, have completely cut off output at those points.

In addition, many other producers have been hampered in their efforts to boost production by difficulty in obtaining sufficient supplies of steel and in securing workers.

Shipments of bolts, nuts, washers, rivets and screws declined 11 per cent in May to a total of $22,820,000, according to the latest government report. At the end of that month the order backlog amounted to about $114 million, an increase of 10 per cent for the month and representing about five months' output at the current rate. Trade reports indicate that further declines were registered in June and July, making total production for the first seven months of the year nearly 40 per cent below that for the corresponding 1945 period.

## Seek To Avert Threatened Strike on Lake Carriers

Negotiations aimed at settling the dispute between Great Lakes shipping interests and the National Maritime Union-CIO and preventing a strike against lake carriers Aug. 15 were underway in Washington last week. Representatives of the maritime union, which has called the strike to win a 40-hour week and other concessions, were holding conferences with Department of Labor officials and some shipping representatives.

The NMU is reported to have contracts with about a dozen lake shipping companies and represents about 5 per cent of the seamen on the lakes. Despite the union's small representation, shipping interests are not discounting the strike threat. It is understood the union, if the strike materializes, will attempt to tie up terminals and it is believed possible such action could seriously hamper lake shipments.

Government and industry interests are chiefly concerned in preventing any stoppage of the iron ore movement, already hard hit by the steel and coal strikes.

## CPA Restores "CC" Ratings For Iron Castings, Steel

Normal operation of the "CC" preference rating system on iron castings and steel, suspended at the time of the steel strike, was restored last week by the Civilian Production Administration, effective Aug. 7. Application for such ratings may be made on form CPA 541-A as provided in priorities regulation 28 as amended.

Direction 18 to the same regulation permits the granting of "CC" preference ratings for iron castings and steel for the manufacture in the fourth quarter of specified items in types suitable for low-cost housing. Separate application must be made on form CPA-4491 on or before Aug. 15 for a "CC" rating for deliveries after Sept. 30 for the specified products.

To validate the carryover of self-certified orders placed upon the mills for September delivery of iron castings or steel, but upon which delivery cannot be made in September, CPA has issued direction 14 to M-21. This direction provides that such orders shall be treated as "CC" orders for October only.

Direction 13 (emergency suspension of outstanding ratings on iron and steel) to priorities regulation 1 will expire Sept. 30 and the previously suspended outstanding preference ratings (except AAA) which had been applied to the delivery of any iron castings or steel products in the forms listed on schedule 1 of M-21 were revoked as of Aug. 7.

# GOVERNMENT CONTROL DIGEST

***Weekly summaries of orders and regulations issued by reconversion agencies. Symbols refer to designations of the orders and official releases. Official texts may be obtained from the respective agencies***

### OFFICE OF PRICE ADMINISTRATION

**Farm Equipment:** Retail ceiling prices for all farm equipment and replacement parts increased effective July 31 an average of about 6 per cent over June 30 levels to enable dealers to realize the same percentage discounts and markups as during peacetime. (MPR-246 and 133; OPA-6645)

**Copper:** Maximum base price for all electrolytic, lake or other fire refined copper established at 14.37½c per pound, delivered in carload lots at Connecticut valley points. This eliminates the two band system of copper prices which resulted from raising the price of copper from mines which had granted approved wage increases, 2.37½ cents per pound June 3. (MPR-15; OPA-T-4834)

**Imports:** Pricing procedure for importers has been simplified by including in the price schedule a list of markups on a series of commodities which may be used by all importers, regardless of whether they have previously sold these imported commodities. (MIPR; OPA-T-4829)

**Hand Tools:** Price increase factors of 10 per cent provided for manufacturers of garden tools and of masons' tools, effective Aug. 1. Price increase factor of 14 per cent for shovel manufacturers replaces the previous 9 per cent rate. Price increase factors of 5 per cent for mechanics' hand tools, 17.3 per cent for cutting tools, and 10 per cent for heavy forged tools continue in effect. (MPR-188; OPA-T-4830)

**Silver:** Ceiling price for standard commercial bars of silver established as of Aug. 1 at 90.5 cents per fine troy ounce or the Treasury's selling price, whichever is higher. Maximum prices for semifabricated silver articles are raised to reflect the increase in the price of silver bullion. Price for silver scrap per fine troy ounce of silver contained, delivered free of all charges, was fixed at 0.25 cents below the maximum base price for standard commercial bars. (MPR-198; OPA-6648)

**Fluorescent Transformers:** Price increase factor granted manufacturers of fluorescent transformers increased from 11 per cent to 20 per cent, effective July 27. Price increase factor for radio transformers having fixed iron cores has been raised from the former 25 per cent to 33 per cent, and for all other radio and specialty transformers from the former 19 per cent to 27 per cent. (MPR-136; OPA-T-4818)

**Construction Machinery:** Sellers of construction machinery and equipment, who have been selling under interim price ceilings 10 per cent above base prices in effect Oct. 1, 1941, may continue to sell at these price levels indefinitely. Previously, this interim increase was slated to end July 15, 1946. Since portable power-driven tools were granted a 12 per cent increase over base prices, these items are not included in the latest OPA action. (MPR-136; OPA-T-4821)

**Effective Dates:** Effective dates on several actions issued prior to expiration of price control on June 30 have been changed to July 26. These include amendments to price schedules covering wire and cable; machines, parts and industrial equipment. (OPA-6631)

### CIVILIAN PRODUCTION ADMINISTRATION

**Steel Exports:** Canadian applicants for priority assistance to obtain steel used in housing projects and farm machinery must apply to the CPA on form CPA-4466 for such aid. Application must be accompanied by a letter explaining the need for priorities assistance. Priorities aid to obtain pig iron has been extended to Canadian manufacturers of farm equipment and housing projects with application required on form CPA-4466 or CPA-4475. "Peanut pickers" have been added to the list of farm machinery entitled to certification assistance. (CPA-LD-186)

# Windows of Washington

*Extension of OPA expected to provide most of ammunition for congressional candidates in this year's political campaigns unless some big new issue arises, although veto of Case labor bill may play some part in deciding elections*

UNLESS some big new issue comes to the fore, such as a sensational development in connection with the Paris "peace" conference, the recent hot and extended debate over the OPA extension bill is certain to provide most of the ammunition which congressional candidates will use in this year's election campaigns. And informed opinion in Washington is that President Truman improved Republican rather than Democratic chances when he signed the bill that now is law.

Significance attaches to a comment by veteran Jed Johnson (Dem., Okla.) who has been a member of the House starting with the 70th Congress. He explained his recent defeat for renomination by saying: "People don't like regimentation and regulations and have to blame somebody, so they blame their congressmen."

The same thought was advanced by Rep. Lyle H. Boren (Dem., Okla.), who also was defeated in his run for renomination. "The general sentiment was to make a change," said this veteran of five consecutive terms. "I think it is the result of people being disturbed by government interference in their affairs."

### Criticism Expected To Grow

The outlook is that price increases will furnish ground for increasing criticism of the party in power over coming months, for it is certain that the bill that was signed will not prevent a wave of price increases that will cause general dissatisfaction. On the first day of its revived price control powers the OPA covered its news tables with the largest assortment of news releases in its history—and most of these told of price rises. Word quickly was passed that this was the beginning and the worst was still to come.

Republican leaders have set their party's position by charging that the price control bill signed by the President is much more inflationary than the one he vetoed on June 29, and they place squarely on his shoulders the blame for the 24 per cent increase in commodity prices—"the prices in those market-basket items which the housewife must buy every day" as Sen. Robert A. Taft (Rep., O.) put it.

Even Democratic leaders agree that President Truman was optimistic when he mentioned the possibility of calling Congress into extra session later this year to set up a more rigorous tax policy to fight inflation.

"I do not think the suggestion that taxes can be raised in this period is a realistic evaluation of our present position, and I think the Congress and the Treasury must know that," Sen. Walter F. George (Dem., Ga.), chairman of the Finance Committee, told reporters.

Even Sen. Claude Pepper (Dem., Fla.), who usually goes all-out for the administration, admitted to newsmen that "there is not the slightest chance of getting increased taxes."

As to Republican leaders, they manifest a confidence and belligerence not noted for many years. Sen. Kenneth S. Wherry (Rep., Neb.), Republican whip, said that "if Mr. Truman calls the congressmen back after they have been home and talked with their constituents they will come back and wipe the OPA off the map."

Much speculation has been indulged in in Washington as to the extent to which congressional approval of and President Truman's veto of the Case bill will feature in deciding elections this year. Prevailing thought is that the importance of this issue will depend a great deal on whether a new wave of strikes for new wage increases develops over the next few months, or whether President Truman can keep the labor leaders in check, until after the the elections, in the face of continuously rising prices. The leaders now are under heavy pressure from their membership which resents the price trend.

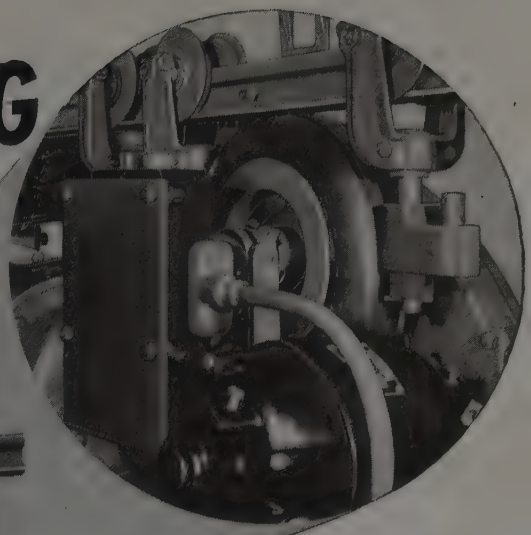
This uncertainty has prevented the White House to date from announcing a second President's management-labor conference to be held this fall. Until there is a better understanding as to how the labor picture will shape up over the next few months, it will be impossible to draw up a satisfactory agenda for this conference. Another angle is that labor leaders, always under the necessity of exerting leadership, are about ready to pull their next rabbit out of the hat—a demand for guaranteed wages—and they are not yet sure whether conditions that will prevail next fall will be propitious.

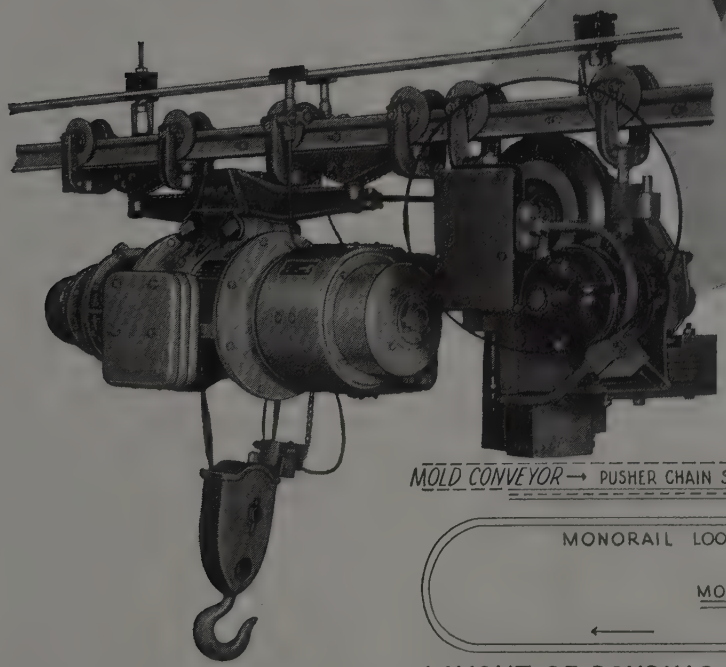
So far, the White House position is that good labor-management relations cannot be legislated. President Truman's leading labor adviser, Reconversion Director Steelman, takes the attitude management-labor relations are nothing more than human relations, and can be resolved only by give-and-take between the parties. But the White House is all too keenly

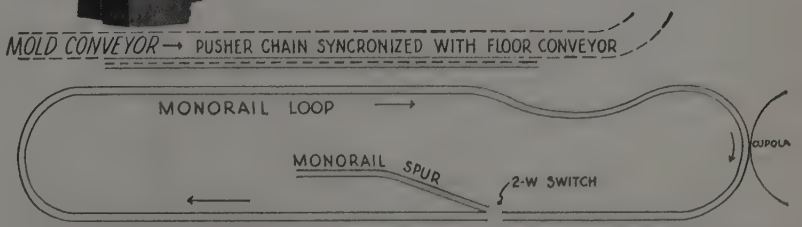
TAKES OFFICE: George W. Taylor, left, is shown being sworn in as chairman, Advisory Committee, Office of War Mobilization and Reconversion. The oath was administered by Frank A. Sanderson, right, of the administration office of the White House. Looking on is Reconversion Director John R. Steelman, center. NEA photo

# FASTER POURING

## with "Free-Wheeling" AMERICAN MONOTRACTOR








LAYOUT OF POURING LOOP FOR CYLINDER HEAD LINE

Here is another example of American MonoRail engineering with the American MonoTractor.

A rubber drive wheel propels a heavy bull ladle from the cupola to floor conveyor carrying flasks. When the unit reaches the pouring area, clutch disengages the MonoTractor drive wheel so that carrier unit can be picked up by an overhead pusher and moved along over the flasks at the same speed as the floor conveyor.

This enables the operator to concentrate all efforts on pouring. No worry about "keeping up" or "getting behind" the flask—operator forgets about horizontal movement and is able to pour metal faster and more accurately.

This principle is applicable to many conveyor lines for process in motion. Let an American MonoRail Engineer go into further details.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVENUE • CLEVELAND 7, OHIO

aware that a large proportion of the voters are not prepared to dismiss the matter in this spirit but feel a strong law to protect the public is necessary. The attitude is that the labor situation is full of political dynamite and that it will be advisable to wait a while in order to avoid making bad mistakes.

## Would Speed Damage Suits

While the OPA debate has held the spotlight, Congress has passed some important measures affecting business. One of these is aimed at facilitating the settlement of damage suits in patent infringement cases. Heretofore, after a court has found that a patent has been infringed, it has been necessary to base a damages award on profits earned by the infringer. This often has been placed under the charge of a special master and sometimes years have elapsed before damages could be legally fixed.

The new law, awaiting the President's signature, was introduced by Rep. Robert K. Henry (Rep., Wis.), a country banker now in his first term in Congress. It authorizes the courts, upon finding infringement, to fix the amount of damages without further procedure. The judge will ask some questions as to how much the product cost, what was the selling price and the profit, how many pieces were made, etc. Mr. Henry feels that the award thus made is likely to be fully as fair as one made after a master has accumulated a huge mass of data over a period of many months. The matter of collecting damages should not only involve less time but should be far less costly under the Henry bill.

The idea behind the Henry bill, incidentally, originally was contained in one of the reports of Charles F. Kettering's National Patent Planning Commission. Recommendations of this commission, which was liquidated last year, have proven most fruitful of results to date, and it is expected many of them will be repeated in the coming report of the new committee appointed by the President last year to report on suggested improvements in the patent system.

Another important bill passed by Congress is the Strategic & Critical Materials Stock Piling Act. Domestic producers may be under the impression, from President Truman's objection to incorporation in this bill of the so-called Buy-American Act of 1933, that they will enjoy a monopolistic status under the government purchase program and hence can get high prices. This impression is not justified, for the Army & Navy Munitions Board, which is charged with setting stockpiling policy, is authorized by the act to buy foreign materials when it finds domestic buying to be inconsistent with the public

EDWIN G. NOURSE

*Is to head the new Economic Advisory Council established under the Full Employment Law. Mr. Nourse is vice president, Brookings Institution, Washington. NEA photo*

interest, when it finds the cost of domestic materials to be unreasonable, or when domestic materials of desired quality are not commercially available.

Under this mandate it is expected much of the stockpile material will be purchased abroad, not only for straight procurement reasons, but as part of the administration's program of stimulating international trade by taking in imports in exchange for exports.

It is significant that no information is to be given out as to the size and character of the government's stockpile. The Army & Navy Munitions Board will treat this information as a military secret.

Incidentally, under the act the Treasury Procurement Division is to be the sole buyer of strategic and critical materials, under directions of the Army & Navy Munitions Board. The Reconstruction Finance Corp., which bought huge quantities of such materials during the war, is out of the business from now on. RFC will continue to ship its inventory of stockpiled materials under directives of the Civilian Production Administration and, after emergency civilian needs have been satisfied during the reconversion period, it will turn over its surplus to Treasury Procurement.

## Secrecy Being Tightened Again

Government restrictions on information which were loosened up almost entirely after V-J Day last year seem to be increasing again, and the policy of secrecy about our stockpile of strategic and critical materials is only one reflection of it. Both the Army and the Navy have classified a great deal of research and development work now under way in government and private establishments, including much that is in process at manufacturing plants in the metalworking industry.

Merely a reflection of a trend, therefore, is the death penalty in the House and Senate-approved Atomic Energy Control bill for violating secrecy regulations with treasonable intent. The bill calls for FBI inspection of all personnel to be employed by the proposed Atomic Energy Commission. Thus, while the bill will amputate the famous Manhattan Project from the activities of the War Department, there will be no easement of the policy of secrecy that mantled all those associated with the development of the atomic bomb. The best to be hoped for is that scientists will be given more freedom of expression under the commission than they enjoyed under the War Department.

Latest assessments of the future of atomic energy include predictions as to its future use for generation of power. In a natural gas hearing recently Dr. E. R. Gilliland, Massachusetts Institute of Technology, predicted before the Federal Power Commission that within 50 years atomic power would compete actively with today's conventional fuels.

## Independent Loans To Continue

While the National Advisory Council on International Monetary & Financial Problems takes the position that the new International Bank for Reconstruction & Development is to be the principal agency to make foreign loans, it is clear from recent events that the United States will continue ready to make loans independently where its special interests are involved.

For example, the council regarded the loan to Great Britain as "a special case," alluding to it as "an integral part of the foreign economic policy of this government."

The council publicly has recognized the need for making United States loans to countries needing for reconstruction purposes such American products as "cotton, tobacco, railroad equipment, machine tools," etc. The council has made no statements with reference to political factors underlying loans. In Washington generally, however, political import is seen in the supplementary loan to France of $650 million on the eve of the French elections, and the loan of $20 million to Czechoslovakia.

Neither does the failure to press Congress for an additional $1.5 billion for the Export-Import Bank of Washington mean any departure from our loan policy.

# Steel Seen Holding Its Position

***Tariff Commission sees little solid basis for suggestion postwar demand will be adversely affected by competition from other metals and materials***

By E .C. KREUTZBERG
*Washington Editor, STEEL*

STEEL has lost no ground in the competition between materials, in the opinion of the United States Tariff Commission, and the rate of steel production in the period immediately ahead and in the next few years will depend as usual on broad economic conditions which affect, favorably or unfavorably, the country's industries in general.

The commission sees no solid ground for the suggestion, made in some quarters, that postwar demand for iron and steel will be more affected by competition from other durable materials—nonferrous metals, plastics, cement, etc., than before the war.

"There seems little reason to expect other materials to be substituted for iron and steel to such an extent as to affect seriously the industry as a whole," states the commission.

"It is possible, and even probable, that in the future the price differential between the light metals and steel will be materially less than it was before the war. If so, these metals more frequently may be substituted for steel. However, steel will doubtless continue to be the dominant construction metal . . . As a result of the great advance in steel metallurgy in recent years, steel can be adapted even better than heretofore to widely varied requirements, and thus better resist invasion of its traditional fields by other metals."

### Complementary Materials

The commission sees little likelihood that plastics will replace steel in sufficient quantities to affect the steel industry appreciably. "No doubt," it says, "the use of plastics for a wide variety of purposes will continue to increase rapidly, but these materials will tend to be substituted for other materials rather than for steel. Moreover, to a considerable extent they create for themselves new uses involving no replacement of other materials. Cement replaces steel to some extent in construction but in general it is complementary to steel rather than competitive with it."

This optimistic conclusion about future prospects for steel is one of the highlights of a report prepared at the request of the House Ways & Means Committee. It was written by Carlyle H. Strand, A. Theodorides and other members of the Tariff Commission's Metal Division.

*Unloading of ore is speeded by use of this Caterpillar diesel tractor equipped with LaPlant-Choate bulldozer to clean up around the unloading bucket in the hatch of a Great Lakes boat*

"Although among all industries the iron and steel industry probably made the greatest quantitative contributions to the war, there was, relative to available prewar capacity, far less expansion in its capacity than in that of a good many industries," states the report.

"Consequently the problem of utilizing available capacity (in the postwar period) is far less serious in the iron and steel industry than in some other industries."

In contrast with other industries which underwent great expansion during the war, the commission reports, steelmaking capacity was "hardly more than a sixth greater" than on Jan. 1, 1940, and pig iron capacity was only "one-fifth greater." Only two specific branches of the industry reflected undue expansion: Electric furnace capacity and plate rolling capacity, and the expansion for rolling plates was effected in large measure by conversion of other facilities. On the whole, the iron and steel industry has rather simple reconversion problems.

The report is optimistic about reserves of raw materials. It does not go along with some claims that, at the wartime rate of consumption, the bulk of the high-grade ores of the Mesabi Range in Minnesota will have been exhausted by 1950 or, at latest, 1954.

Iron ore, the report stresses, occurs in vast deposits in certain parts of the United States. It sets actual reserves of high-grade ore in 1944 at 4.3 billion tons of which 1.5 billion in the Lake Superior district contain 50 to 55 per cent iron and 2.8 billion in the Alabama district, eastern Pennsylvania, New Jersey and northeastern New York and in other areas contain 35 to 40 per cent iron (as mined). In addition there are potential reserves of somewhere between 53 and 75 billion tons.

A shortage of high-grade ores probably will be postponed by an abundance of cheap scrap, discovery and development of new deposits of high-grade ore near old deposits, and somewhat larger imports of foreign iron ore. "Moreover as high-grade ore becomes scarcer, the effects are likely to be lessened by progress in finding less costly methods of treating the lower-grade ores which are abundant in this country.

"There seems, therefore, little prospect that for a long time to come the iron and steel industry of the United States will be seriously affected by difficulties of obtaining satisfactory ore at reasonable cost.

"Indeed," the report continues, "it is

doubtful whether much shift in the geography of the iron and steel manufacturing industry will take place as the result of changes in sources and qualities of the ore. It seems likely that by the beneficiation of the low-grade ores the Lake Superior district will long continue to be the principal source of supplies for the most important center of the industry, the East North Central States (including western Pennsylvania).

"However, some increase will probably occur in the relative importance of the eastern source of iron ore (mainly northeastern New York, eastern Pennsylvania and New Jersey) and of far western sources (mainly Utah and California). This increase may result in somewhat greater expansion of iron and steel manufacturing in areas close to these sources.

"Imports of iron ore may become relatively more important in the future, thus tending to expand somewhat the steel industry along the Atlantic coast."

With the approaching exhaustion of the high-grade Lake ores, the iron and steel industry along the Atlantic coast may tend to expand, utilizing larger quantities of foreign ore, says the report. But it does not foresee any deep penetration of foreign ore into the interior of the country "unless the St. Lawrence waterway is developed for the navigation of large vessels, a development which might extend farther inland the markets for imports.

### Flow of Imports May Change

"Some change may also occur in the relative importance of the sources of iron ore imports; the most likely change would be larger imports from Brazil and Canada (the Lake Superior region), in both of which countries iron ore mining has been materially expanded during the war, partly with the assistance of United States government capital.

"Other sources which may increase in importance are Venezuela, where the Bethlehem Steel Co. is developing iron ore properties; Mexico; and, in the more distant future, Labrador and eastern Quebec, some 300 miles north of the Gulf of the St. Lawrence."

Because of high costs, war damage and rehabilitation needs, it is unlikely that steel will be imported from continental Europe into the United States even in the limited volume of some of the prewar years. Great Britain despite substantial increases in production costs and despite heavy requirements at home, may invade our quality steel domestic market to improve its dollar exchange position. Sweden may be expected to resume the sale of high-grade steels here although the metallurgical progress made in the United States during the war should enable American steelmakers to meet this competition at least as effectively as before the war.

Recalling that considerable pig iron was brought to the United States from The Netherlands and India before the war, the Tariff Commission thinks both countries are unlikely to resume this business on any sizable scale. The Netherlands will need her pig iron for home needs and for other European markets. India probably will keep more pig iron at home to supply her expanded steel capacity.

In general, the commission does not expect any substantial volume of export business for the American iron and steel industry. United States blast furnaces and steel plants have been located mainly in the interior to supply domestic markets and, except for special concessions in rail rates to seaports, and low rates at which some plants can use inland waterways in shipping to the seaboard, are not generally situated favorably to compete in the world markets. This situation does not apply so strongly in the case of sheet and strip for special purposes, and the new alloy steels we developed during the war, but whether we will be able to sell sizable quantities of such quality steels in competition with the Swedes and the British remains to be seen.

The report concludes that our competitive position in the year ahead in exporting machinery, vehicles and other goods in which iron and steel are dominant materials will be at least as strong as it was before the war — probably stronger because so many countries now are well provided with dollar exchange, also because of the strong position of the United States in the field of foreign loans and investments. A factor which will exert an influence as time goes by is the increasing industrialization of many countries—such as, for example, the expansion of steelmaking capacity in Brazil, Canada and Mexico.

## Sees Pittsburgh Retaining Top Place as Steel Producer

Belief that Pittsburgh will continue to maintain its position as the nation's leading steel producing district has been emphasized by Charles R. Cox, new president of Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp.

Pittsburgh steel leaders, heavily entrenched behind a $900 million investment, have no intention of relinquishing first place to any other area, Mr. Cox asserted.

The Ellwood City, Pa., specialty plant of National Tube Co., U. S. Steel Corp. subsidiary, will be moved to Gary, Ind., in about three years, Mr. Cox said. Approximately 3000 workers are involved in the move which will result in more efficient operations than are possible at the Ellwood installation. Employees whose jobs are in jeopardy will be offered work at other National Tube plants, it is said.

## Castings Shipments Decline, Forgings Shipments Rise

Shipments of steel castings and malleable iron castings were lower in June than in May, while shipments of steel forgings increased, the Department of Commerce has reported.

June shipments of steel castings totaled 123,551 tons, compared with 129,211 tons in May, and June shipments of malleable iron castings amounted to 61,650 tons, compared with 62,598 tons in May.

Steel forgings moved in June totaled 146,612 tons, compared with 138,599 in May.

All of the decrease from May to June in shipments of steel castings occurred in movement of alloy grade. Unfilled orders for all grades of steel castings for sale to the trade dropped from 381,654 tons at the end of May to 361,293 tons at the end of June. However, unfilled orders for malleable iron castings for sale rose from 279,065 tons at the end of May to 287,026 tons at the end of June.

Likewise, backlog of orders for steel forgings for sale rose from 598,505 tons at the end of May to 610,204 tons at the end of June.

## Premium Metal Prices Made Retroactive to June 30

Payments under the recently extended Premium Price Plan for copper, lead and zinc are retroactive to June 30, John R. Steelman, director, Office of War Mobilization and Reconversion, ruled last week.

At the same time, Mr. Steelman as director of economic stabilization directed that approved retroactive wage and salary increases recently granted by mine operators be taken into consideration in the payment of premium prices for copper and lead in accordance with commitments made by the Office of Economic Stabilization.

Payment of premium prices for copper, lead and zinc until June 30, 1947, is authorized in legislation which extended the life of the Office of Price Administration for another year. An appropriation of $100 million was made available for these payments.

LOCKS REBUILT: The great locks at Ymuiden, Holland, which were blown up by the Germans in the recent war, have been rebuilt and are again open for sea traffic. The SS *Oranje*, flagship of the Netherlands Line, is shown entering the lock at Ymuiden after the opening ceremony. NEA photo

# Britain Cuts Steel Exports

***Third quarter allocation reduced to 275,000 tons owing to pressing domestic demands. Larger imports of semifinished steel urgently required to prevent work stoppages at rerolling works. Production exceeds 13 million ton annual rate***

By J. A. HORTON
*British Correspondent, STEEL*

*BIRMINGHAM, ENG.*

EXPORTS of British steel are to be cut by about one-third during the next few months owing to the necessity of satisfying imperative home demands. The cut will apply to tin plate or to alloy and special steels, exports of which will be maintained, possibly increased.

Decline in exports in June compared with May is attributed to the fewer working days, time having been lost by "V" day and the Whitsuntide holiday.

Although steel exports in June amounted to only 50,165 tons compared with 194,914 tons for the same month a year ago, the total for the first half of 1946 jumped to 1,213,019 tons from 157,243 tons for the like 1945 period.

As expected, the highest individual item in exports for the first six months of this year was 174,029 tons of sheets of one-eighth inch and upwards. In the same period, Britain exported 168,986 tons of rails, and 138,895 tons of steel bars. Galvanized sheets at 14,509 tons compare with only 479 tons in the like period a year ago.

Exports are still subject to control by government departments which have allocated 275,000 tons for the third quarter. This tonnage will include strip, light rails, arches, small bars, light angles and casement sections.

Refined pig iron is the only type of that product which is permitted to be exported and there is no prospect of any other grade going abroad. Prices of refined pig iron have been advanced 10s per ton to Continental countries and £1 per ton to other destinations. Under present circumstances, it is necessary to buy pig iron from overseas, though on a smaller scale than a year ago. In June, 1946, Britain bought 1501 tons as aganst 9557 tons in the same month in 1945 and the total for the half year in 1946 was only 12,992 tons compared with 98,740 tons a year ago.

The great need of the moment is for Britain to buy larger quantities of semifinished steel for rerolling purposes. Indeed, it is urgently necessary in order to prevent stoppages at rerolling works. In June, 1945, there were no imports of semifinished steel but in the like month a year ago Britain bought 28,548 tons and, in addition 6239 tons of steel ingots. Imports of semifinished steel increased during the first six months of this year to 141,189 tons from only 45,612 tons in the like 1945 period. Total iron and steel imports through June of this year amounted to 226,819 tons compared with 220,949 tons in the same period a year ago.

It was always necessary before the war to buy semifinished steel abroad, most of which was done under cartel agreements with Europe. When that ceased America came to the rescue and when lend-lease came to an end Canada became a source on a restricted scale. A quantity was also bought from Australia, but shipping is difficult and freight charges high because of the great distances involved.

Increased supplies are not expected to be available much before the end of the year. In the meantime, output from home makers has been stepped up, but the total is not likely to be sufficient to keep the rerollers going at maximum production. Much of the steel going into the domestic market is for high priority work, such as housing.

Production of steel during the second quarter was at the rate of 13,110,000 tons annually. This is an increase over the figure of 12,617,000 tons for the first quarter of this year and compares with 11,814,000 tons in the second quarter of 1945. Pig iron output in the second quarter was at the rate of 7.827,000 tons a year compared with 6,894,000 tons in the corresponding period of 1945. June production was at the rate of 7,879,000 tons a year compared with 6,916,000 tons a year ago.

The quantity of coal exported in June was the smallest for any month since last August. The seriousness of the fuel position was set out by the minister of fuel and power, Emanuel Shinwell, when he told the House of Commons that the estimated stock of coal at the beginning of the coming winter will be about 11 million tons, or 5 million tons less than necessary for safety.

The rate of increase for automobiles was maintaned in June but there was a great falling off in exports of railway rolling stock from the high April and May figures.

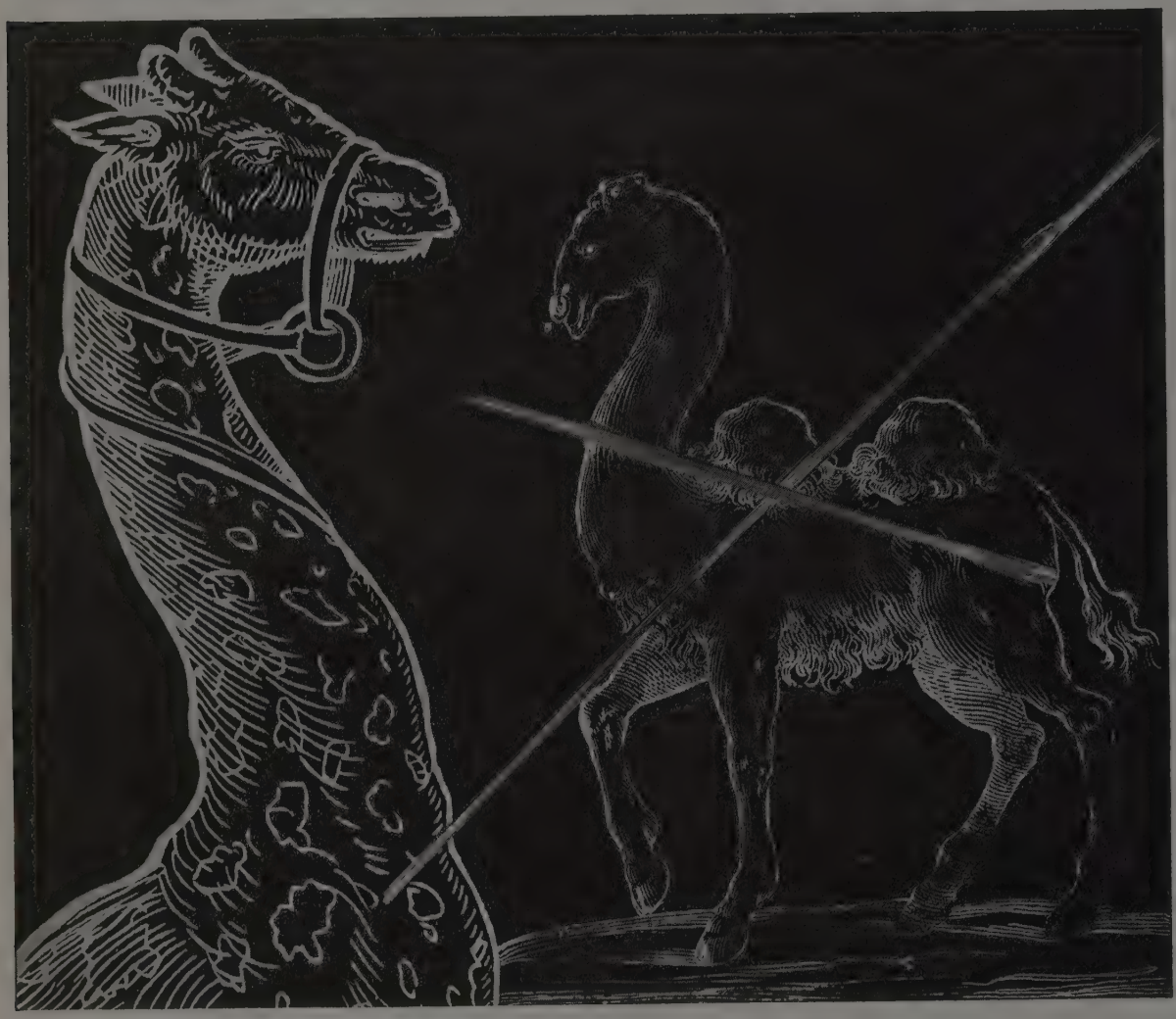
No fresh development has taken place in regard to the nationalization of the British steel industry. It is understood that the government is having some difficulty in securing personnel for the steel board which is to control the industry.

# ONE MORE STRAW—ONE LESS CAMEL!

Many centuries ago the weight of one last straw broke a camel's back. Thus somebody's artless optimism about the strength of a vital part wrecked a perfectly good materials handling system.

Today it is plain, cold fact that ignoring the depressing effect of low temperatures on the impact strength of vital steel parts can be a short cut to a long line of avoidable, costly troubles.

The solution for the problem in the fable was less load or more camel. For the modern problem the answer is a molybdenum steel that combines the deep hardening and freedom from temper brittleness necessary to provide good low temperature impact strength.



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By A. H. ALLEN Detroit Editor, STEEL

# Mirrors of Motordom

*Check on labor productivity in automotive plants reveals sharp reductions from prewar levels. Quality of workmanship has deteriorated, as many employees are new to auto assembly techniques. Union opposes studies of efficiency*

DETROIT

BECAUSE of recurring and unpredictable shortages of materials and parts it has been a pretty tough proposition to make any definite determination of automobile workers' productivity. There has been a general feeling that it is far below normal, yet without a steady flow of material no accurate measure of the real work being done by production crews can be made. In recent weeks, however, there have been a few inklings which appear to confirm earlier suspicions. At one plant, where it was possible to build up inventories during a shutdown to the point where uninterrupted production could proceed, a check made without the knowledge of workmen or the UAW-CIO showed output per man to be 45 per cent under the 1941 pace. That is much worse than the estimate made earlier this year by Henry Ford II of a 34 per cent decline.

Report coming from another auto plant is to the effect certain working crews arbitrarily take a 15-minute rest period every hour—unauthorized by either the management or their union contract. In other plants much grumbling has been heard from groups working around ovens and furnaces; many have just walked off the job on hot days.

### Defective Work Halts Plant

On a recent Friday it was necessary to stop assembly operations at the Pontiac plant because there were so many cars off the line which needed minor touch-up and repairs resulting from faulty workmanship that no more assemblies could be accommodated. The management decided to clear out all the defectives before resuming production and it took a full day to do this. One reason for the large number of cars rejected by final inspectors is the high percentage of "green" help now at work—men unfamiliar with the proper assembling and finishing techniques who are going to need a period of time to become properly skilled in their various tasks. After four years of interrupted automobile production, even some of the former skilled workers have lost their touch. On top of these facts is a general "the hell with it" attitude which has assumed the proportions of a national epidemic. Prescription for the cure remains to be written.

So, in addition to a lagging production pace, a deterioration in the quality of workmanship has developed. A specific case . . . . purchaser of a 1946 model in the $1400 price field recently drove his car home from the dealer's place of business where it supposedly had been placed in first-class condition. Noticing a loud rumble and bumping noise in the vicinity of the right front wheel, the new owner took the car back to the dealer where a mechanic drove it and immediately returned it to the shop, removing a front wheel to discover four or five loose bolts in the front suspension system, each requiring a few turns with a wrench to bring up tight. Factory inspection negligence undoubtedly was the cause, but beyond that the difficulty probably arose from the lackadaisical effort exhibited by many assembly line workers.

## Automobile Production

**Passenger Cars and Trucks—U. S. and Canada**

*Tabulated by Ward's Automotive Reports*

| | 1946 | 1941 |
|---|---|---|
| January | 121,861 | 524,073 |
| February | 83,841 | 509,332 |
| March | 140,777 | 533,878 |
| April | 248,318 | 489,856 |
| May | 247,620 | 545,321 |
| June | 214,511* | 546,278 |
| July | 341,000* | 468,897 |
| **Estimates for week ended:** | | |
| July 20 | 80,985 | 109,912 |
| July 27 | 84,720 | 105,635 |
| Aug. 3 | 78,190 | 62,146 |
| Aug. 10 | 80,000 | 41,795 |

*Preliminary.

With even the more responsible union leaders coming to the realization that increased productivity per man-hour is the only solution to a burgeoning inflation, it is interesting to take a look "down the line" in the automotive industry where estimates have placed individual productivity as much as 50 per cent off from the 1941 or prewar level.

Most manufacturing executives are familiar with the device known as the Chronolog, developed many years ago by National Acme Co., for automatically timing the various elements in a processing operation. One of these measuring units was installed recently in a Ford grinding department, eliciting the following comment which was published in the union newspaper of Ford UAW-CIO local 600 for July 27:

"Workers in department 498 in the motor building are willing to bet that they're plagued with the damnedest invention ever brought into an auto plant. The company has installed one of the cruelest, most cold-blooded devices ever invented. It's a mechanical stool-pigeon! It is a robot measuring device that is attached to a crankshaft grinder. It records every split second of a worker's time in an 8-hour production period. It operates on a code dial system. A code letter is used for each element in an operation. It records the actual time used to grind a crankshaft, and totals the amount of cranks in a day's work. It records time used for machine setting and dressing of wheels. It records time used for personal time away from the machine—such as going to the toilet, going to the water fountain, etc.

### "Robot Time Study Machine"

"The mechanical stool pigeon is called a Chronolog and is best described as being a robot time-study machine. The Chronolog probably will eliminate most time-study men from the payroll, and we can foresee a period when committeemen will find themselves arguing over speedup with robot foremen who will be able to write 'refer to labor relations' on all our first-stage grievances.

"The following elements are not yet included in the calculations of the robot: Fatigue time, which is sorely needed for the heavy work done on the crankshaft job; it doesn't record weight tonnage a worker handles in an 8 hour day. The apparatus is deaf and dumb—it only measures time. One will get you two that while you can't beat this mechanical gumshoe, it can sure beat the ——— out of you.

"The underlying purpose of the machine is a furtherance of the old Ford system of speedup. It's a system designed to get the last ounce of energy out of every worker so that he can slump out to Miller road and be fast asleep before his streetcar or bus gets to Michigan avenue. . . .

"By the way, the department has a contest for the best name for the Chronolog. Latest entrants are Eagle Eye, Dick Tracy, Mr. Hitler and Dracula."

To some, this puerile gibberish may sound funny, but it must be remembered the distortions are read by hundreds of

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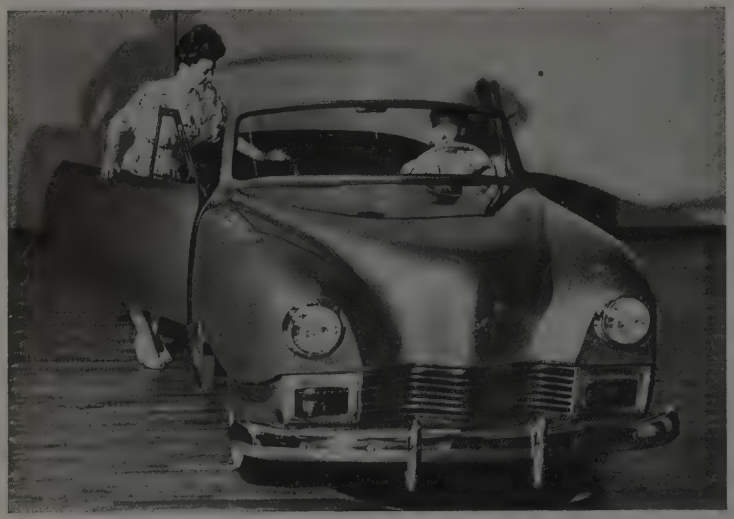


NEW DARRIN: This is the new Darrin convertible coupe, custom styled by Howard Darrin. It sells for about $2000, has a 6-cylinder Continental engine, weighs 2400 lb, has a 115-in. wheelbase, and seats six comfortably. The car is being manufactured by the Hayes Mfg. Corp., Grand Rapids, Mich. NEA photo

working people who do not know a Chronolog from a monolog. It is most unfortunate they cannot be told the truth about such devices before union propagandists unloose their poison pens. Unless the truth about productivity and means to achieve it can be got across to the man at the machine, all the pious pronouncements in the world at higher levels of union and management are superfluous.

If the foregoing comment were just one isolated instance, it might be understandable, but in the same newspaper is more in the same vein, originating in the Ford plastic department. Some excerpts: "As far as we can see, even stronger attempts to speed up all jobs will be made by the Ford efficiency experts. It has become increasingly clear with each day that the management is trying to twist clauses covering production standards to their own advantage. Somebody at the top has quietly issued instructions to reinstitute the old Ford system that was in effect before the union organized the plant. . . .

"Boiled down to simple terms, the demand for more and more and more production from every man and woman working in the plant is nothing more than the demand for more and more and more profits for the company. Quick profits."

In the face of such rantings over efforts to restore a semblance of the productivity in effect at auto plants before the war, it certainly would appear that managements have a real educational job cut out for themselves.

## Strike Fever Mounts

After receding appreciably from the delirious levels of early this year, the strike fever in parts plants and the motor industry started to climb a little again this week. A tieup at the Dura Co. in Toledo, producer of body hardware for many units of the industry, had stopped Hudson and Studebaker and was in imminent danger of affecting other builders. Then early last week a dispute reportedly arising from refusal of maintenance workers to handle machinery repairs on Saturday closed Packard and was quickly reflected at the Briggs body source which also had to suspend. The company insisted such repair work could be done only on Saturday when production lines are not running. The union disagreed and said it could be handled during regular hours if maintenance men now unemployed were hired; another union spokesman said the walkout was the result of the company discharging men "for reasons of ill health". In any event no formal statement of grievance was filed, the men simply walking off their jobs.

## Reuther Proposal Flops

Dissension was appearing in top circles of the UAW-CIO following the dismal failure of Walter Reuther's proposed production conference, other union officials stating they did not go along with the idea at all. For his part, Reuther at once released a six-page statement excoriating the industry and calling on the Mead Committee in Washington to launch an investigation of materials shortages, alleged monopoly controls over production, labor relations and public relations, effects of the carry-back provisions of the tax law, and the possibility that OPA-authorized price increases on automobiles encourage low-volume production.

## Designs New Car

A new passenger car designed by Howard Darrin was previewed in Los Angeles recently. It is built on a 2 x 6-in box frame chassis which forms the outside structure of the car and serves as side bumpers. Front fenders and hood are in one piece and may be lifted hydraulically to allow motor inspection, rear panel also is one-piece construction. The passenger compartment seats three in front and two in the rear (an arrangement used, incidentally, in the new Willys-Overland 6-cylinder passenger car now being tooled for production). The Darrin job weighs 2400 lb, has torsion bar suspension in front, semi-elliptic leaf springs in rear, 6-cylinder Continental L-head engine, hydraulically operated windows, doors and front seat, 115-in. wheelbase. The designer says he hopes to sell the car for less than $2000 but no production has been started. It is understood Hayes Mfg. Co. in Grand Rapids has worked on the development and doubtless will build the bodies, perhaps the entire car, if and when.

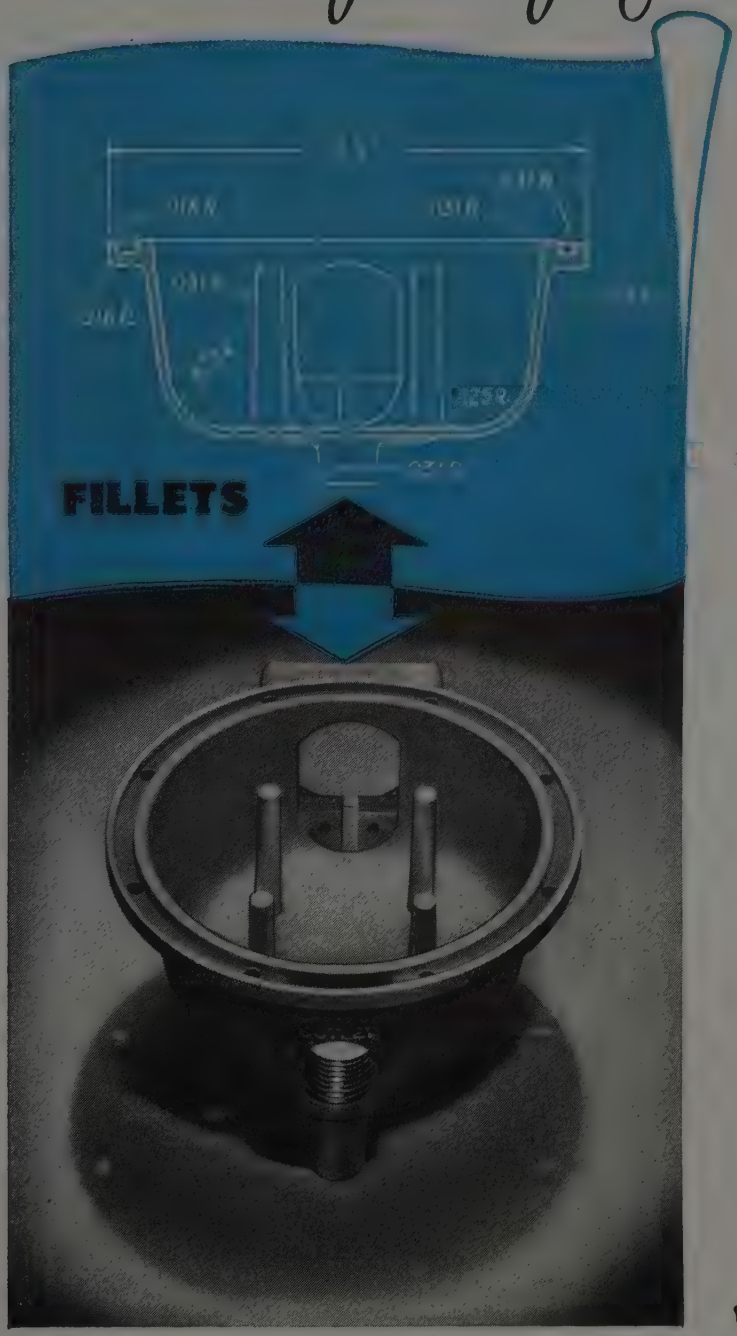
## U. S. Rubber Buys Plant

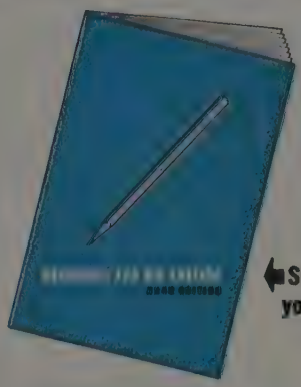
United States Rubber Co. has purchased the government-owned aircraft engine parts plant at Fort Wayne, Ind., operated by Studebaker during the war. Manufacture of automotive rubber parts other than tires, such as engine mounts, steering wheels, gaskets, grommets, seals, etc., will be concentrated there, after transfer from Detroit plants. About 1200 will be employed.

## Completes Expansion

Lakey Foundry & Machine Co. has practically completed its $875,000 expansion and modernization program at Muskegon, Mich., which included installation of 7000 ft of power conveyors, new shakeout equipment, ventilating system, shotblasting machinery and a large heat treating furnace. Lakey has backlog of $6 million in castings orders, divided about 40 per cent from passenger car manufacturers, 45 per cent from truck and tractor builders and 15 per cent from household appliance makers.

# *Designing for* DIE CASTING



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In designing die castings, remember that the use of fillets to avoid sharp corners is desirable for a number of reasons. Fillets will:

1. *Provide greater strength (even the smallest fillets have an appreciable strengthening effect).*
2. *Improve the flow of metal in the die, which is likely to result in smoother surfaces on castings.*
3. *Provide a gradual transition from thick to thin sections.*
4. *Facilitate die construction and ejection of castings from the die.*

A radius of .015" minimum is suggested in place of sharp corners and larger radii are desirable when conditions permit. Fillets of .015" radius are barely noticeable even on outside edges and, in fact, a .030" radius is seldom evident except on close inspection. The zinc alloy die casting shown here—a governor body—has been designed with liberal fillets both inside and out, as indicated on the drawing.

Additional data on fillets and other design considerations will be found in our booklet "Designing For Die Casting". To insure that you will get the most from your die casting dollar, ask us—or your die casting source—for a free copy of this booklet.

**ZINC**
FOR DIE CASTING ALLOYS

THE NEW JERSEY ZINC COMPANY, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on

**HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC**

# Aircraft Firm Adds New Line Of Products

***Ryan Aeronautical Co. in expanding its activity will make alloy metal casket shells; also gets Navy research contract***

IN ITS PROGRAM to utilize fully its facilities and manufacturing techniques, Ryan Aeronautical Co., San Diego, Calif., has begun manufacture of alloy metal casket shells to be supplied to casket makers and finishers.

Entrance into manufacture of non-aeronautical products does not represent any lessening of Ryan's interest and activities in the aircraft field, the company pointed out, adding that it has just received from the U. S. Navy's Bureau of Aeronautics a contract for a metallurgical research program in connection with development of new types of materials suitable for jet power plant and exhaust systems equipment.

The company entered both the programs through its Metal Products Division which was organized early this year to further develop, in both the aircraft and non-aeronautical fields, the company's established business as one of the country's leading designers and fabricators of stainless steel and other high quality metal alloy products.

First showing of Ryan casket shells at a recent assembly at Kansas City of casket industry representatives from all parts of the country brought firm orders for 20 carloads of casket shells with a value in excess of $350,000. The Ryan plant is being tooled up for large-scale casket production, and a delivery rate of 1000 casket shells per month is scheduled to be reached by early fall. While the first production orders are for chrome nickel alloy casket shells, other high quality durable alloys, principally copper and bronze, also will be used subsequently.

Details concerning the contract from the Navy for a metallurgical research program have not been disclosed except for the basic announcement that the company in co-operation with the Navy would conduct research work on new high heat-resistant alloys and on products fabricated from these new materials.

Employment at Ryan Aeronautical Co. will approach the 2000 mark by late fall. One hundred additional production workers and technicians will be added each month for the next four or five months.

TOY INDUSTRY DEVELOPING: Many former war plants in southern California have turned to developing a huge toy industry. Some of their new products, children's sidewalk bikes, are shown being loaded for air-shipment to the East. NEA photo

# BRIEFS . . .

***Paragraph mentions of developments of interest and significance within the metalworking industry***

**Blaw-Knox Co.**, Pittsburgh, has purchased the building and land located at 317 Penn Ave., that city, and will use the property to house its expanded engineering departments.

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**Service Caster & Truck Corp.**, Albion, Mich., newly organized, has purchased Service Caster & Truck Division of Domestic Industries Inc., Chicago, which will continue its manufacturing operations.

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**Association of Steel Distributors Inc.**, New York, has admitted the following firms to membership: Virginia Scrap Iron & Metal Co. Inc., Roanoke, Va.; Viking Steel Co., Cleveland; Commercial Metals Co. Ltd., Dallas, Tex.; California Metals Co., Oakland, Calif.; and Price Iron & Steel Co., Chicago.

—o—

**Watson-Stillman Co.**, Roselle, N. J., has added a 100-ton capacity single action press to its line of metal-forming presses.

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**Pipe & Tube Products Inc.**, New York, has changed its name to Reading Tube Corp.

—o—

**H. M. Harper Co.**, Chicago, manufacturer of nonferrous and stainless steel

fastenings, has moved its branch facilities from Houston, Tex., to Dallas, Tex. The new office will be supervised by W. H. Kreer.

—o—

**Denison Engineering Co.**, Columbus, O., has appointed Calco Machinery Co., Philadelphia, as representative for the Philadelphia area.

—o—

**Hewitt Rubber Corp.**, Buffalo, a division of Hewitt-Robins Inc., has moved its Philadelphia district office and warehouse from 20 South 15th St. to 401 N. Broad St.

—o—

**Coaltoter Conveyor Co.**, 310 S. Michigan Ave., Chicago, has changed its name to **Material Movement Industries** to more accurately portray the breadth of the company's equipment and activities in the materials handling field.

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**High Precision Products Co.**, Westfield, N. J., has been formed to represent Cosa Corp., New York, as distributor for Swiss-made machinery.

—o—

**Metallizing Co. of America**, Chicago, has moved its eastern office and warehouse to 431 East 75th St., New York 21.

## U. S. Rubber Co. Acquires Plant at Ft. Wayne, Ind.

United States Rubber Co., New York, has purchased for $2,100,000 a government-built plant in Ft. Wayne, Ind., and will use it in producing industrial rubber products.

The plant, built in 1941 by the Reconstruction Finance Corp. for the Studebaker Aviation Corp., was used during the war for the manufacture of aircraft engine gears. The buildings are one story, airconditioned, windowless and equipped with fluorescent lighting. The floor space, including both manufacturing and administrative departments, totals more than 400,000 sq ft.

It is expected that the plant will employ about 800 people at first, increasing to 1200 in six months. Further increases are expected when full production is attained.

## Floating Dry Dock for Navy Launched by Dravo Corp.

A self-contained, open end floating dry dock, largest vessel ever to be launched on inland rivers, slid down specially built ways at Dravo Corp.'s Neville Island plant on the Ohio river, near Pittsburgh, Aug. 10.

The vessel, designed by the U. S. Navy's Bureau of Yards & Docks, is 448 feet long and 97 feet wide. Height to top of the wing-wall is 45 feet. Lifting capacity of the dry dock is 6000 tons. Its 73-foot wide docking chamber will accommodate most of the Navy auxiliary or tender type ships.

## Cambridge, O., Truck Rim Plant Offered by WAA

War Assets Administration has offered for sale or lease the Firestone truck rim plant at Cambridge, O. The plant, used as a sheet rolling and galvanizing facility, has been renovated to produce truck rims but actual production had not started.

The plant is located on a site of about four acres and consists of five buildings providing about 111,000 square feet of space, a train shed and a paint storage house. Included in the equipment are 23 machine tools.

## Union Drawn Steel Plants At Massillon, O., Improved

An 11-month construction and improvement program at the Massillon, O., plants of the Union Drawn Steel Division, Republic Steel Corp., Cleveland, has been completed.

At the main Union Drawn plant a new brick and steel structure and bays, totaling 50,000 sq ft of floor area, have replaced a group of wooden buildings. Carbon and alloy steel bars, shapes and wire are produced at this plant.

At Union Drawn plant 2 an extensive interior improvement program has put the entire plant into use in producing stainless steel bars, shapes, and wire. In 1937 one bay of this plant was equipped for a limited production of stainless steel drawn products. Use of a second bay was added in 1940. The present improvement puts the entire 70,000 sq ft of floor space of this building into production of stainless products.

## Linde Air Products' New Plant Under Construction

Linde Air Products Co., New York, has begun construction of an oxygen cylinder filling station and acetylene producing plant in Boise, Idaho. The new facility is expected to be completed by the latter part of this year. At present the company is operating an oxygen acetylene warehouse in Boise.

## Dallas Metal Fabricators Form Trade Association

Metal fabricators of Dallas, Tex., have formed an association known as the Dallas Metal Manufacturers Association for the purpose of conferring on common problems, promoting their businesses along a united front and developing most favorable condition for the expansion of the metalworking industry in their area. Metal fabricators who are members of the Dallas Manufacturers & Wholesalers Association, a section of the Dallas Chamber of Commerce, are eligible to membership.

Officers of the new organization are: L. B. Jones, Mosher Steel Co., president; J. P. Travis, Universal Corp., first vice president; W. W. Finlay, Guiberson Corp., second vice president; L. H. P. Klotz, Luscombe Airplane Corp., treasurer; and Mark Hannon, executive secretary-manager.

## Addition Being Constructed At Heil Co. Milwaukee Plant

Construction has been started on another unit in the plant expansion program of the Heil Co., Milwaukee. This $50,000 addition to the company's Plant 3 at Milwaukee will add more than 110,000 sq ft of manufacturing space to its 52-acre layout. This addition will give the building a straight line production area more than a third of a mile long with rail facilities through its entire length.

Another 30,000 sq ft building is under construction at the company's Plant 2 at Hillside, N. J., and a new three-story sales office building has just been completed at Plant 1, Milwaukee.

## Metal Furniture Firm Has $525,000 Expansion Plans

Expansion of National Metal Products Co., Carrollton, Tex., which produces metal furniture, has been announced by J. Curtis Sanford, president and general manager. The company plans to spend $525,000 to expand its manufacturing facilities, and a contract has already been let for an addition of 20,000 square feet to house equipment for making chromium dinette furniture, according to Mr. Sanford, who added that the company also plans an investment of $300,000 in a strip mill and a tubing mill next year.

## Timken-Detroit Axle Co. Buys Ohio Site for Plant

Timken-Detroit Axle Co., Detroit, has acquired a 45-acre site in Ashtabula, O., where it plans to build a plant for manufacture of brakes and related parts. Employment is expected to total about 500 when full production is reached.

# Plomb Tool Co.'s Volume, Payrolls 40% Above 1945

***Backlog equal to six months' sales and incoming orders still exceed shipments. Rising demand for hand tools seen***

*LOS ANGELES*

PLOMB TOOL CO.'S payrolls and volume of business now are 40 per cent greater than at the end of the war. This was disclosed recently by Morris B. Pendleton, president of the company, a leading maker of small steel hand tools operating in Los Angeles, Chicago and Portland, Oreg.

In the six months ended June 30, the company earned a net profit of $668,714 on its 311,191 shares of outstanding stock.

Sales for the first half of 1946 totaled $6,696,745. Current backlog is equal to approximately six months' sales volume and incoming orders continue to exceed shipments.

Plomb employs 1420 persons in Los Angeles alone. It uses about 800 tons of steel a month, mostly carbon steels, alloys, cold drawn and hot-rolled. Total Plomb employment is about 1600.

Mr. Pendleton explains the increased volume as follows:

"Our mechanized economy was vastly accented during the war. This means that in comparison to other production fields, equipment and tools made of steel and other metals will remain the object of an ever-increasing demand for a long time to come.

"Military establishments, offices, homes, farms—in fact virtually every field of human activity will use more and more of mechanical devices produced by metal-working industries. This spells more and more tools for production and maintenance. It also spells unprecedented prosperity for the metals industries in this, the most efficiently organized mechanized nation in the history of the world.

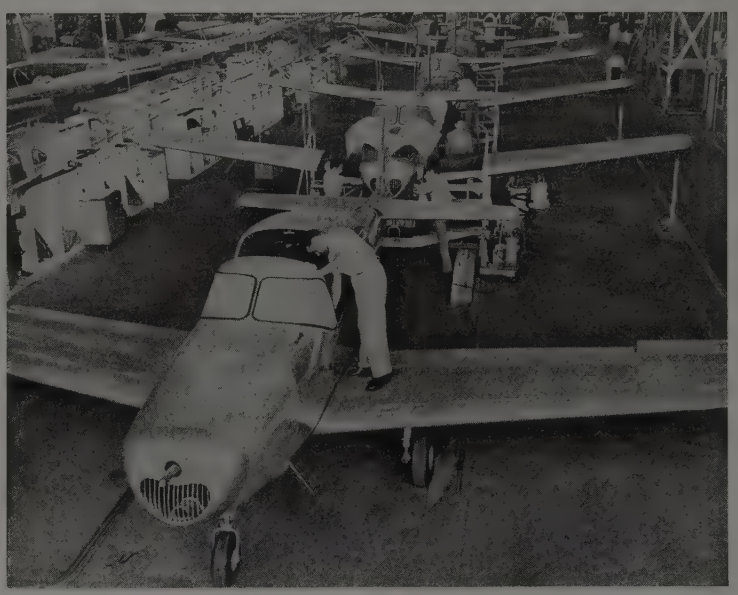
"All manufacturers in this field, particularly, should prepare for production schedules undreamed of in domestic markets at any time in the past."

Still another Los Angeles concern's fiscal report reflected reason for mounting optimism on the part of industrialists of the area. This was the balance sheet released by Ducommun Metals & Supply Co., which reports a net income of $484,881 in the first six months of the year on a gross of $7,495,066. Compared with last year's same period net of $172,026, the current figure is seen as a sign of the times—the end of the reconversion era in industry.

A third indication of the same trend was contained in the words of E. C. Hummell, president of the Metal Trades Manufacturers Association and head of Utility Steel Foundry. Mr. Hummell said:

"Local plants generally are busy on backlogs of orders. New business is accelerating at a steady rate. Sizable expenditures are being made for plant rearrangements and new additions, although these activities are being retarded by reason of building material scarcities, particularly electrical equipment.

"Labor turnover rates are high in most plants, with needs for both skilled and unskilled help continuing. The principal difficulty in the labor field lies in the insistence on job selectivity by applicants."



**MASS PRODUCTION: This mechanized conveyor line at the Los Angeles plant of North American Aviation Inc. will turn out the company's new four-place, all metal private Navion airplanes, pictured here, at the rate of ten or more daily. NEA photo**

## Public Works Projects Call for Much Steel

*SEATTLE*

In addition to a strong demand for steel items required in general industrial construction, public works projects are calling for major tonnages in the Pacific Northwest. The Columbia Basin, Bonneville, Coulee and state highway jobs are outstanding and involve many large contracts.

In some instances mounting costs are acting as a deterrent but much needed work has been delayed so long that projects are being pushed nevertheless. As an illustration the cost of the Anderson Ranch dam in Idaho, a reclamation irrigation job, has doubled in five years. Original cost was estimated at $13 million. Already $18 million has been spent and it will require $7 million more to complete the highest earth-fill dam in the world.

Reclamation Bureau announces Westinghouse Electric Co. apparently low for Coulee dam equipment, $1,100,000 for one generator and $3,390,000 for three, delivery fob East Pittsburgh.

Reclamation Bureau has called bids Aug. 26 for shapes for the Fallon relift plant, Buffalo Rapids project, Montana, and for shapes for proposed machine shop, Nyssa, Oreg., and steel warehouse, at Coulee. On Aug. 27 bids will be opened for 15-ton traveling crane for Payette project, Idaho. On Aug. 28 tenders will be received for five 3000-barrel steel silos, with bucket elevators, hoppers, feeders, conveyors and accessories for the Columbia Basin improvement, Spec. 1498; Aug. 29 for 12-foot-diameter welded steel plate penstock and outlets for Cascade dam, Payette project; Sept. 4 for 12.7 mile 69kv transmission line, same project. Award has been made to American Bridge Co. at $63,866 for 120-foot steel barge for Coulee dam, about 300 tons plates. Lehigh Structural Steel Co. is low at $26,535 for supplying 134 tons for switchback at Coulee. Seattle Bronze Co. has

been awarded an $18,240 contract for aluminum hand rails for the left power house, Coulee. Schmitt Steel Co., Portland, is low, $2320 for stop logs, Bonneville dam.

## Graham Industries Begin Operations in Bay Area

*SAN FRANCISCO*

A new manufacturing organization, which will assume large proportions if present plans are fulfilled, has started functioning in the San Francisco Bay area.

It is Graham Industries Inc., which is the parent firm for five new enterprises. Altogether, these are expected to employ 3500 workers eventually.

Graham Industries has taken over the West Yard adjacent to the Moore Dry Dock Co. on the Oakland Estuary. This government-owned shipyard facility was built during the war at a cost of $9 million.

Graham has taken possession of the property under an interim lease from the War Assets Administration for a maximum period of six months. When inventory of the facilities is completed at that time the property will be offered for disposal to the highest bidder. It is believed almost certain, however, that Graham will bid for the property.

The five firms to be operated as subsidiaries of Graham Industries are:

Graham Development Co., which will manufacture semifabricated houses.

Graham-Doane Truck Co., which will assemble low-bed trucks.

Graham Commercial Refrigeration Co., which will produce large size commercial refrigeration units.

Graham Drydock Co., which will do ship repair work.

Graham Durable Furniture Co., which will make steel household furniture.

## Envisions Great Advances In Atomic Propulsion

*SEATTLE*

Atomic propulsion, safe flight at speeds from hovering to several times the speed of sound, unlimited range in terms of world distances and travel into outer space may be possible during the next three decades, engineering and sales vice president Wellwood E. Beall declared recently on the thirtieth anniversary of the Boeing Aircraft Co. He added that such things as safe flight regardless of weather conditions, natural color televised navigational aids, foolproof personal aircraft and completely automatic controls could be realized in the next thirty years of aviation.

# Lower Freight Rates from Geneva Steel Plant to West Coast Asked

***United States Steel proposes reduction from $12 to $8 a ton. California industrialists claim downward revision would bring many new fabricating plants to serve needs of Pacific rim markets. Coastwise reductions also will be sought***

*SAN FRANCISCO*

STRONG plea for approval of lower railroad rates on steel moving from the Geneva Steel Co. mill in Utah to Pacific Coast points was voiced and reiterated by leading industrialists at recent hearings here before the Pacific Freight Tariff Bureau.

This reduction, they said, is necessary if the West's new industrial economy is to be successful.

U. S. Steel Corp., owner of the Geneva plant, has asked for a reduction from the present $12 a ton rate to $8 a ton. Geneva Steel Co., in outlining its need for this cut, at the hearing stated that action is needed quickly by the railroads as the mill expects to start rolling plates early in August.

No definite opposition to the rate request appeared at the meeting. However, Kaiser Co. and Bethlehem Pacific Coast Steel Corp. told the tariff bureau that if the rate reduction were granted they would seek comparable percentage reductions in coastwise rates. Kaiser Co. also plans to ask similar cuts on eastbound rates from its plant at Fontana, Calif., into Utah and other southwest territory as well as reductions on coal and iron rates from Utah to Fontana. These would be designed to bring rates in line with eastern ratios between coal and iron and finished product tariffs.

### Foresee Increase in Plants

Witnesses appearing at the hearing here forecast a large increase in the numbers of new fabricating plants which would come about as a result of lowering the rate from Geneva. It was pointed out that West Coast population is expected to double in the next 20 years and expansion of these plants is necessary to serve that market adequately. These fabricators must be able to compete successfully with eastern firms, however, if such growth is to be obtained and that competition on an equitable basis will not be possible if the delivered cost of steel is not lowered through a rate reduction, they pointed out.

One of the strongest pleas for favorable action on the rate revision came from Kenneth T. Norris, president, California Manufacturers Association, and of Norris Stamping & Mfg. Co., Los Angeles.

Mr. Norris said manufacturing had now become the major source of income to Californians as a result of the industrial revolution that has occurred in the West. He pointed out that "there are relatively unlimited opportunities for California's further industrial growth."

Mr. Norris stated that at the present $12 freight rate, Geneva would be of little use to the West, but if a more favorable price is set on steel as the result of a rate reduction, "new industries will come into the state and area."

Alden G. Roach, president, Consolidated Steel Corp., also strongly endorsed the rate reduction, and at the same time sharply rapped "Pittsburgh plus" steel costs for western industry. Mr. Roach foresees the whole Pacific slope as a united industrial region where the new warborn steel plants will be the keystone of an economic independence for the West.

Governor H. B. Maw, of Utah, also spoke at the hearing, urging the development of Utah's raw material resources can be developed only if the western industrial progress is not impeded.

Other witnesses pointed out development of western industry would have effect on development of the whole Pacific basin by providing the Philippines and the Orient with products.

## Kaiser Aluminum Plants Meet Production Schedules

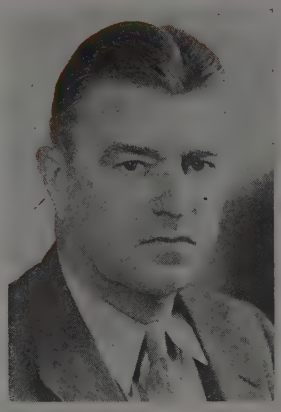
*SAN FRANCISCO*

Permanente Metals Corp. (Henry J. Kaiser) announced that production of aluminum at the companies' leased plants at Spokane, Wash., during July, first month of operation, had fulfilled proposed schedules.

Output at the Trentwood mill last month was 4,020,000 pounds of aluminum. At the same time it was reported that a second potline had been put in operation at the Mead reduction plant. According to present schedules, the plants will produce 80 million pounds of aluminum by the end of the year.

# Men of Industry

LEO J. PANTAS



W. R. HARRISON

C. D. BARR

**Leo J. Pantas** has been appointed plant manager of the new Buffalo plant, Yale & Towne Mfg. Co., New York. Mr. Pantas was superintendent of the radar department of the company's Stamford, Conn., Division, before being transferred to the company's executive offices in New York last January to aid **Maxwell C. Maxwell,** assistant to the president for production, in organizing the Buffalo plant for the production of home electric appliances. Mr. Pantas originally joined the company in 1929, in the Yale & Towne apprentice school in Stamford.

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**T. F. DeNormandie** has been named branch manager, Buffalo office, Jessop Steel Co., Washington, Pa. He has been with Jessop for the last ten years in various departments, including production, sales, and the Sheet and Plate Division.

—o—

**Robert L. Springer,** former sales and service engineer for Vanadium-Alloys Steel Co., Latrobe, Pa., and for the last seven years Chicago sales manager, Rustless Iron & Steel Corp., Baltimore, has returned to Vanadium-Alloys as engineer and representative in the Chicago district.

—o—

**Sidney E. McCrum** has been appointed advertising manager, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Denver. Mr. McCrum was assistant advertising manager of Wickwire Spencer Steel Co., New York, before the merger of that company with Colorado Fuel & Iron Corp.

—o—

**Paul G. Strom** has been appointed supervisor of agricultural extension, American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp. The Steel & Wire company has announced expansion of its agricultural extension activities as a service to farmers. Mr. Strom, recently releaased from the Navy, will edit the *Farm Pictorial,* 15 year old publication issued quarterly by the company. He will work closely with state agricultural colleges, Farm Bureaus, the Department of Agriculture, 4-H boys and girls clubs, livestock associations and county agents.

—o—

**W. R. Harrison** has been elected president, Cleveland Tapping Machine Co., Cleveland. Mr. Harrison had been president and general manager, Spun Steel Corp., Canton, O. He was with that company more than 19 years. **Mark Graves** has been elected vice president of the Tapping Machine company, and will continue in charge of sales and engineering. **W. E. Hamaker** has been elected secretary and treasurer of the company. **A. R. Wise** has been named factory manager. Mr. Wise had been associated with Spun Steel Corp. for over 19 years in various supervisory capacities.

—o—

Rigid-Tex Corp., Buffalo, has elected the following officers: **Richard S. Smith,** president and treasurer; **John E. Emerson,** vice president and general manager; **E. S. Sidway,** assistant general sales manager.

—o—

**Alfred C. Howard** has been named vice president in charge of manufacturing, Eversharp Inc., Chicago. **Edwin P. Hart** has been appointed controller of the company, and **John W. Dean Jr.,** manager of the firm's new Long Island City, N. Y., plant. Mr. Howard had been with Fairbanks, Morse & Co., Chicago, for 30 years, and since 1937 was superintendent of that company's operations at Beloit, Wis. Mr. Hart had been a staff specialist with Frazer & Torbet, Chicago accounting firm for the last two years. Prior to that, he had served two years as comptroller's special representative, Oil Well Supply Co., Dallas, Tex., a subsidiary of United States Steel Corp. Mr. Dean was associated with Firestone Steel Products Co. and Firestone Aircraft Co., Akron.

—o—

**C. D. Barr** has been named president, American Cast Iron Pipe Co., Birmingham. He succeeds **W. D. Moore,** who is retiring after having served the company as president for the last 22 years. Mr. Barr had been vice president and secretary of the company since 1937. Mr. Moore joined the firm in 1908 as a mechanical engineer.

—o—

**Charles S. Thorne,** vice president and general manager, Birmingham Electric & Mfg. Co., Birmingham, has been reelected president of the Jefferson County Safety Council for the new year.

—o—

**Austin Logan Ford,** Cleveland, has been appointed exclusive agent in the Cleveland and northern Ohio area for Lovejoy Tool Co. Inc., Springfield, Vt. The Austin Logan Ford office is managed by **Richard K. Spangle,** who is assisted by his brother, **Robert Spangle.**

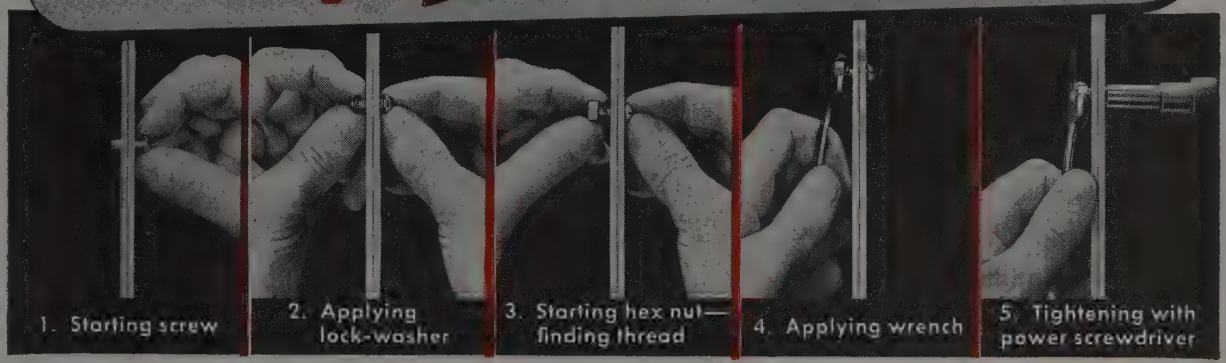
—o—

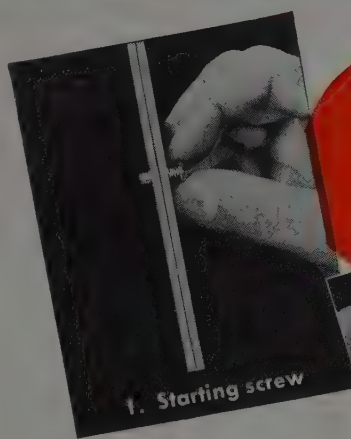
**Donald J. Reese,** Development & Research Division, International Nickel Co. Inc., New York, has been appointed to the new Gray Iron Division advisory committee of the American Foundrymen's Association, Chicago.

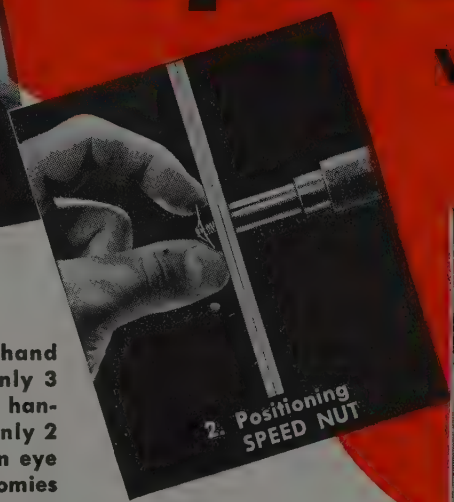
—o—

**Victor E. Rennix** has been appointed Chicago regional sales manager, Electro-Motive Division, La Grange, Ill., General Motors Corp., Detroit, succeeding **Clyde A. Sattley** who retired July 1, after 20

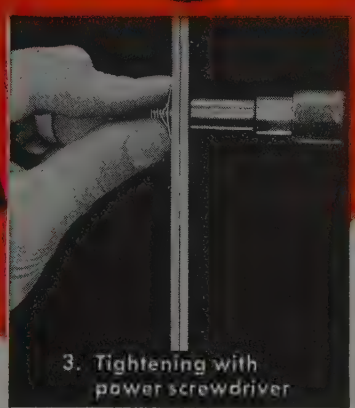
# Why 5 Operations?




# Speed Nuts will do it in 3




**Why go through 5 hand operations when only 3 are necessary? Why handle 3 parts when only 2 are required? For an eye opener on the economies of the SPEED NUT system just multiply this 40% motion-saving by the millions of fasteners you use per month. Then add to that the saving by eliminating ⅓ of the parts. Your figures will amaze you. And your product will be protected against loosening from vibration besides. Engineers who move up faster are those who know how to make assembly lines move faster. Please send your assembly details as SPEED NUTS are made in over 3,000 shapes and sizes.**

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In France: Aerocessoires Simmonds, S. A., Paris
In England: Simmonds Aerocessories, Ltd., London
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed Nuts* PATENTED

MORE THAN 3000 SHAPES AND SIZES

*Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

years with the division. Mr. Rennix now is in charge of sales and service and parts activity in the region. The division's Central Service organization territory has been re-zoned. **M. H. Gardner**, service manager, and **J. E. O'Leary**, field engineer, both formerly Central regional men, have been transferred to St. Louis in the same capacities. **W. E. Dunn** becomes Chicago service manager, after having been Central district engineer. **L. M. Williams** and **N. A. Minor** have been transferred from the La Grange plant to St. Louis and Chicago, respectively, as parts and stores representatives.

—o—

**Elmer A. Marquardt** has been appointed zone sales manager in charge of the new Philadelphia office, General Detroit Corp., Detroit, and General Pacific Corp.

—o—

**Sherman R. Lyle, William Earle Bryden,** and **Alfred J. Kinnucan** have been appointed district sales engineers, Steel & Tube Division, Timken Roller Bearing Co., Canton, O. Mr. Lyle has been assigned to the company's Cleveland district. He joined Timken in 1940 as a metallurgical assistant in the Steel & Tube Division. Recently he had been in the steel sales department of the company. Mr. Bryden, who has been appointed to the Chicago district, joined the Timken company as an assistant in the metallurgical department in 1937. In 1940, he became sales engineer for the New York district. He was recently released from the Navy. Mr. Kinnucan, also recently released from the Navy, has been assigned to the company's New York district.

—o—

**Rear Adm. Lawrence B. Richardson,** retired deputy and assistant chief, Navy Bureau of Aeronautics, will become associated with Curtiss-Wright Corp., New York, as executive assistant to the president, effective Sept. 1.

—o—

**James Herman** has been appointed eastern district sales manager, Ahlberg Bearing Co., Chicago. His territory will cover Boston, New York, Philadelphia and Washington. Mr. Herman joined the company in 1935. Recently he had been Philadelphia branch manager.

—o—

**Victor E. Nelson,** president, Universal Oil-Seal Co., and Nelson Mfg. Corp., both of Pontiac, Mich., has been appointed Pontiac chairman of the Committee for Economic Development, New York. **Thomas I. S. Boak,** works manager, Winchester Repeating Arms Co., New Haven, Conn., a division of Olin Industries Inc., has been appointed Connecticut state chairman, and New Haven community chairman, of the committee. **E. M. Cabaniss,** manufacturing vice president, Joseph Dixon Crucible Co., Jersey City, N. J., has been appointed community chairman of that city for the committee. **Carl Zapffe,** manager, iron ore properties, Northern Pacific Railway Co., has been appointed Brainerd, Minn., community chairman of the Committee for Economic Development.

—o—

**Marcus J. Aurelius** has been elected sales vice president, United States Steel Supply Co., Chicago, succeeding **Leslie B. Worthington** who has become president of the company. He will maintain headquarters in Chicago and have sales jurisdiction over warehouses operating there, and in Baltimore, Boston, Cleveland, Newark, N. J., Pittsburgh, St. Louis and St. Paul. Mr. Aurelius has been associated with United States Steel Corp. subsidiaries for most of the last ten years. Since October, 1944, he was assistant to manager, Railroad Materials and Commercial Forgings Division, Carnegie-Illinois Steel Corp., Pittsburgh.

—o—

**C. E. Phillips** has been appointed sales and advertising manager, Marine Division, Arnolt Motor Co., Warsaw, Ind. Mr. Phillips, for the last three years, was industrial and public relations director, Clark Equipment Co., Buchanan, Mich.

—o—

**Leigh B. Block** has been elected a director, Inland Steel Co., Chicago, succeeding **J. H. Morris,** who retired in April as secretary. Mr. Block was elected vice president of Inland in 1939, and is now in charge of all purchases. He began his business career at the Indiana Harbor works of the company in 1924.

—o—

**Frank R. Kettering,** supervisor of the company training school at East Pittsburgh, Pa., Westinghouse Electric Corp., has retired. He was with the company 47 years, all but 19 of which were spent in training school work. Nine engineers of the Westinghouse corporation will go to Oak Ridge, Tenn., to join the pool of scientific manpower which will work on peacetime applications of atomic power. On one year loan from the Westinghouse Research Laboratories are: **Dr. Elmer B. Ashcraft,** chemical and metallurgical department; **Dr. Sidney Siegel,** magnetic department; **Dr. R. C. Masen,** electro-physics department; and **Dr. Jerald E. Hill** and **Dr. L. P. Hunter,** electronics department. Other Westinghouse engineers assigned include two from the East Pittsburgh works, **J. W. Simpson** of the switchgear engineering department, and **A. H. Toepfer** of the district engineering and service department; and two from the South Philadelphia, Pa., works, **N. J. Paladino** and **E. F. Miller** of the Steam Turbine Division. The engineers will carry on research at the Institute of Nuclear Studies.

LEIGH B. BLOCK

—o—

**Logan W. Mulford Jr.,** recently released from the Army, has been appointed assistant manager, American 3-way Luxfer Prism Co., New York.

—o—

**Michael Miller** has been appointed vice president in charge of procurement and administrative engineering, Kaiser-Frazer Corp., Willow Run, Mich. He has been associated with Kaiser enterprises since 1931. **Joacquin F. Reis** has been appointed vice president in charge of fiscal operations of Kaiser-Frazer, serving also as assistant secretary and assistant treasurer. He has been associated with Kaiser interests on the West Coast since 1925.

—o—

**J. G. McCarty** has been appointed Pittsburgh branch manager, Howe Scale Co., Rutland, Vt., succeeding **H. J. Steidley,** retired. Mr. McCarty joined the company's Pittsburgh branch as service engineer in 1941.

—o—

**Lewis W. King** has been appointed manager of roll sales, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He has been with the Birdsboro company for the last nine years, and is also roll designer and sales engineer of rolling mill machinery for the organization.

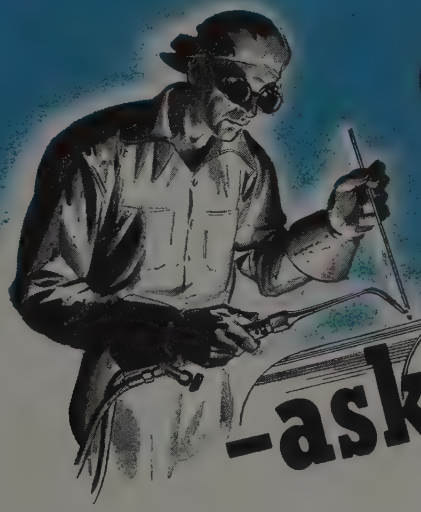
—o—

**Ellis P. Mason** has been named district manager of the new Louisville branch office, A. Finkl & Sons Co., Chicago. Mr. Mason had been with the Dodge Chicago plants of the Chrysler Corp., Detroit.

—o—

Atlantic Steel Co., Atlanta, Ga., has elected the following officers: Vice president, **Howard B. Johnson;** vice president and general superintendent, **R. S. Lynch;**

# For Answers on Stainless Welding -ask EASTERN!



**Atomic Hydrogen?** Does atomic hydrogen welding of E-S 18-12 Mo (Type 316) produce welds as corrosion resistant as those made by a metallic arc?

**Gas-Welding 18-8?** What other compositions of chrome-nickel Stainless, besides E-S 18-8 (Type 302) can be oxyacetylene welded?

**Tank Annealing?** Is it necessary to anneal and pickle small outdoor storage tanks of E-S 18-8 LC (Type 304) after metallic-arc welding?

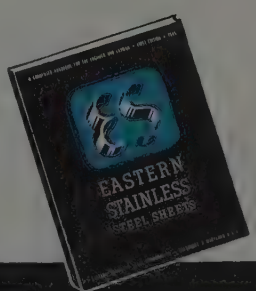
**Weld Vibration?** Do spot welds in light gages of E-S 18-8 sheet (Type 302) stand up under rapid vibration over long periods of time?

**Bonding to Steel?** What is the best way to join E-S 18-8 Stainless sheet (Type 302) to low-alloy steel hangers without a noticeable joint?

Eastern welcomes your questions about joining stainless steels. Whether they concern arc or gas welding, atomic hydrogen, or heliarc welding of light-gage sheet . . . Eastern Stainless' technical men have answers based on experience. "Eastern Stainless Steel Sheets", a modern book about a modern metal, gives you much data on joining. Send for your copy, and if you need further help, get in touch with any of our 18 offices or distributors.

JMLco E-D1

*ask Eastern for the answer when Stainless is the question*




**EASTERN STAINLESS STEEL CORPORATION**

BALTIMORE 3, MARYLAND • Distributors' stock available in most areas

CHICAGO · CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · PHILADELPHIA

treasurer, **Gilbert Purvis;** and assistant secretary, **W. F. Glenn. C. F. Williams** has been appointed general sales manager of the company.

—o—

**Brig. Gen. Donald Armstrong,** who recently retired from the Army after 36 years of service, has joined the staff of the American Standards Association. He will assist **Howard Coonley,** chairman of the ASA executive committee, in expanding and developing the activities of the association.

—o—

**Dr. William L. McCracken,** recently released from the Army, has been appointed administrative assistant to **C. F. Dirley Sr.,** vice president in charge of research and engineering, Detrex Corp., Detroit. Dr. McCracken originally joined the corporation in 1939.

—o—

**Theodore K. Burgenbauch** has been appointed production manager, Electronics Division, Ellinwood Industries, Los Angeles. He will supervise production engineering, stock control, assembly and product test for the firm. Until six months ago, he was assistant factory engineer, Electronic Tube Division, General Electric Co., Schenectady, N. Y.

—o—

**A. A. Straub** has been named president and general manager of the newly organized Gas Atmospheres Inc., Cleveland.

—o—

**E. G. Schroeder** has been named to head the new Detroit district office of Electric Products Co., Cleveland. This new district office will handle all sales and service negotiations in the territory, which consists of Michigan, northwestern Ohio and northeastern Indiana. Mr. Schroeder was with General Electric Co., Schenectady, N. Y., for more than seven years.

—o—

**Warren J. Holmes** has been named export representative in the Philippine Islands for Allis-Chalmers Mfg. Co., Milwaukee, and will work with the Earnshaw Docks and Honolulu Iron Works, distributors of heavy industrial equipment for the firm's General Machinery Division.

—o—

**K. D. Clark,** formerly zone manager at Portland, Oreg., for Pontiac Motor Division, Pontiac, Mich., General Motors Corp., has moved to Los Angeles to assume leadership of that zone, succeeding **John Bathrick,** who has resigned to become Pontiac dealer in Highland Park, Calif. **S. H. Reeder** succeeds Mr. Clark as zone manager at Portland. Mr. Reeder had been assistant zone manager. Mr. Clark began his career with Pontiac as a district manager of the Portland zone in 1936, and was made zone manager in 1944. Mr. Reeder, recently released from the Army, originally joined Pontiac in 1936.

—o—

**A. J. Baker** has been appointed manager of rubber thread sales, B. F. Goodrich Co., Akron, succeeding **Karl Ryan,** resigned. Mr. Baker joined the company in 1927, and had been manager of the Du Bois, Pa., plant since 1944. **C. J. Phillips** succeeds Mr. Baker as manager of the Du Bois plant. With the company since 1920, Mr. Phillips had been production superintendent of its Clarksville, Tenn., plant since 1939.

—o—

**Alexander Saunders,** recently released from the Navy as a lieutenant, has returned to Alexander Saunders & Co., New York. Mr. Saunders had been on active duty since 1943. Serving as a communications officer, he saw service in the Atlantic and Pacific areas, including Mandalay, Shanghai and Australia.

—o—

**Col. Thomas A. Crystal,** U. S. Army, retired, has been appointed supervisor, Regional Veterans' Division, Cleveland office, War Assets Administration. **S. G. Coates,** who formerly headed the Priority & Special Services Division, will become head of the newly established Public Interest Division.

—o—

**J. F. Woessner,** general works auditor, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed chairman of the industry conference of iron and steel controllers which will be a part of fifteenth annual meeting of Controllers Institute of America, to be held in New York, Sept. 15-18.

—o—

**Irwin A. Marshall** has been appointed transmission engineer, Factory Equipment Co., Detroit. He had been sales manager, American Gear & Mfg. Co., Chicago. For six years, Mr. Marshall was Cleveland sales manager, Foote Bros. Gear & Machine Corp., Chicago. He spent 16 years as sales engineer with Boston Gear Works Inc., North Quincy, Mass.

—o—

**Lee B. Thomas,** president, Ekco Products Co., Chicago, has been appointed a member of the board of directors of the Institute of Design.

—o—

**Willard R. Beye** has joined the staff of Midwest Research Institute, Kansas City, Mo., where he will work in the design and development section. Mr. Beye had been senior engineer, Transcontinental and Western Airlines, Kansas City, Kansas. **Y. W. Luke,** recently released from the Navy, has joined the Research Institute's Mechanics Division as a computer and mathematician.

—o—

**I. H. Lundgren** has been appointed assistant chief engineer, Warren, O., district, Republic Steel Corp., Cleveland, succeeding **H. K. Ihrig** who was recently promoted to chief engineer. Mr. Lundgren had been with the Central Alloy district of the company, in Canton and Massillon, O., since 1933, as a draftsman and later as an engineer.

—o—

**George O. Hendee,** Havertown, Pa., has been appointed sales engineer, Philadelphia territory, Hannifin Mfg. Co., Chicago. The territory includes southern New Jersey, eastern Pennsylvania, and Delaware. Mr. Hendee was recently released from the Army.

—o—

**John B. Mitchell** has been appointed general manager of manufacturing operations, and **Carl C. Henning,** general manager of raw materials, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Mitchell had been assistant to the vice president in charge of manufacturing operations. Mr. Henning was manager of raw materials.

—o—

**W. B. Eakin** has been named general manager, Ekco Products Co. (Canada) Ltd., wholly owned subsidiary of Ekco Products Co., Chicago. Edward Marder has been named to head a newly created sales office of the company in Detroit. Mr. Marder has been with the Ekco company since 1935.

—o—

**J. William Barker** has been appointed vice president and general manager, Industrial Furnace Division, Loftus Engineering Co., Pittsburgh. Mr. Barker was formerly with Stein-Atkinson Ltd., London, and Chapman-Stein, Mt. Vernon, O. He was one of the founders of Rust Furnace Co., Pittsburgh.

—o—

**Dr. W. M. Shafer** has joined the research department, National Radiator Co., Johnstown, Pa. He will perform metal powder research for the firm's Plastic Metals Division, as well as research on the company's heating and industrial products. Dr. Shafer had been a member of the research and metallurgical staffs of Fansteel Metallurgical Corp., North Chicago, Ill.

—o—

**Henry Moecker Jr.** has retired as manager, Cleveland Mfg. Division, American Stove Co., St. Louis. Mr. Moecker had been manager of the Cleveland plant since 1934, having joined the company in 1896 at Harvey, Ill. He was a member of the firm's board of directors for

PERRY SNYDER

*Who has been appointed chief engineer, Aetna-Standard Engineering Co., Youngstown, noted in STEEL, July 29 issue, p. 64.*

JOHN E. GOBLE

*Who has been appointed president, National Tube Co., Pittsburgh, noted in STEEL, Aug. 5 issue, p. 97.*

F. V. LOCKEFER

*Appointed general sales manager, Mid-States Equipment Corp., Chicago, noted in STEEL, Aug. 5 issue, p. 116.*

many years. **A. W. Leeseberg** has been appointed manager of the company's Cleveland Manufacturing Division. He has been with the organization 40 years, and was recently production co-ordinator of the Cleveland division.

—o—

**Earl J. Breech,** general manager, Merz Engineering Co., Indianapolis, has been elected to the board of directors of Marmon-Herrington Co. Inc., Indianapolis. **David M. Klausmeyer,** president of Marmon-Herrington, and **C. Alfred Campbell** and **Guy C. Dixon,** vice president and treasurer, respectively, were also elected members of the board. Merz Engineering Co. is a wholly owned subsidiary of Marmon-Herrington Co.

—o—

**Virgil V. Grant** has been elected treasurer, Caterpillar Tractor Co., Peoria, Ill., succeeding **W. J. McBrian** who was elected a vice president of the company in May, 1944. Mr. McBrian will now devote more time to administrative responsibilities in connection with the purchasing and treasury departments. Mr. Grant had been assistant treasurer of the company since early 1944.

—o—

**Charles G. Purnell** has become associated with Cabot & Co. Inc., Pittsburgh. He had been a district contact metallurgist with Carnegie-Illinois Steel Corp., Pittsburgh, for 19 years.

—o—

**John H. Faunce Jr.** has been appointed district manager of sales of the newly opened Chicago office, Lukens Steel Co., Coatesville, Pa., and subsidiaries, By-Products Steel Corp., and Lukenweld Inc. Mr. Faunce has recently been released from the Navy. Prior to the war, he was associated for five years with American Rolling Mill Co., Middletown, **O. Robert M. Bowman** will be associated with Mr. Faunce as a member of the Chicago sales staff. Mr. Bowman joined Lukens in 1942, and had recently been with its flanging sales department.

—o—

**Kenneth W. Green** has been appointed assistant purchasing agent, Electric Storage Battery Co., Philadelphia. He joined the company in 1927. In 1937, he was appointed manager of railway sales, and early this year the Engineering Sales Division, which he had been supervising during the war, was merged with the Railway Division, and he was put in charge as manager.

—o—

**Samuel J. Zeigler,** former Navy captain, has joined the Des Moines, Iowa, plant of Solar Aircraft Co., San Diego.

## OBITUARIES...

**Frank L. Stephens,** 65, president, Viking Automatic Sprinkler Co., Chicago, died Aug. 4, in Downers Grove, Ill.

—o—

**Paul Shoup,** 72, president, Merchants & Manufacturers Association of Los Angeles, died in that city recently.

—o—

**Stuart Whitney French,** 79, retired general manager of western properties, Phelps-Dodge Corp., New York, died recently in San Marino, Calif.

—o—

**Dwight C. Warren,** New England manager of *The Iron Age,* Philadelphia, died Aug. 2 in Hartford, Conn., after a brief illness. He had been associated with *The Iron Age* in this capacity since 1910, having been previously with *The Iron Trade Review* (now STEEL) and *The Foundry,* Cleveland. He was active in the Western New England Chapter of the National Industrial Advertisers Assn.

—o—

**Louis J. Desparois,** 51, St. Louis district sales manager, Pickands, Mather & Co., Cleveland, died recently in St. Louis.

—o—

**Chester J. Roberts,** 57, industrial engineer, and former manager of the Industries and Trade Promotion Divisions, Milwaukee Association of Commerce, died recently near Glendale, Calif.

—o—

**Carl J. Zaiser,** 67, president, Ampco Metal Inc., Milwaukee, died July 29, at his home in Wauwatosa, Wis. In 1920, he took over American Metal Products Co., a small Milwaukee firm, and developed it into the present day Ampco Metal Inc. He was also regional vice president of the National St. Lawrence Waterway Association.

—o—

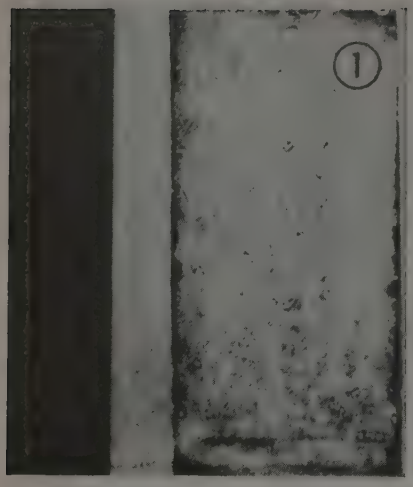
**A. E. Norris,** 50, president, Regina Corp., Rahway, N. J., died recently at his summer home in Bay Head, N. J. He was vice president and a member of the executive committee of the Vacuum Cleaner Manufacturers' Association.

—o—

**David Oakley Hagedorn,** 27, founder and head of Hagedorn Engineering, Los Angeles, died recently, after a cardiac operation. He had been organizing Dornson Corp. as a new manufacturing enterprise shortly before his death.

—o—

**Raphael F. Davis,** 76, secretary and purchasing agent, Creamery Package Mfg. Co., Chicago, died recently in Highland Park, Ill.




# SCIENTIFIC of Metal Cleaners

*Fig. 1—Appearance of clean and oiled steel, left, when viewed under ultraviolet radiation. Mineral oil fluoresces brightly while clean metal appears black*

*Fig. 2—Luminograms of steel with mineral oil, cleaned with varying concentrations of sodium metasilicate*

*Fig. 3—Assembly showing oil coated panel in test cleaner*

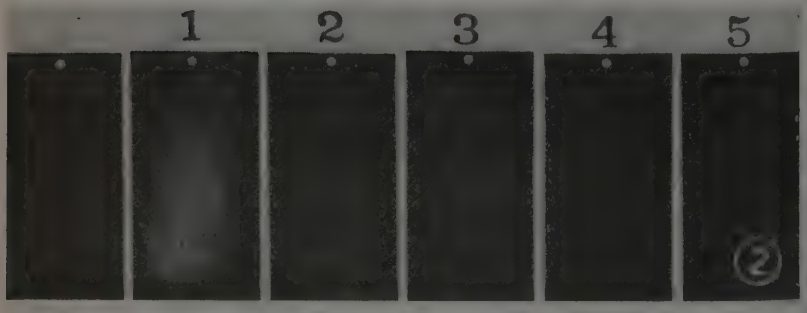
*Fig. 4—Photographic arrangement for recording results using fluorescent test method. A, ultraviolet lamp; B, 4 x 5 in. view camera with K-2 filter and Tri-X film; C, slot for camera adjustment; D, distance from camera lens to easel, approximately 36 in.; E, easel; F, metal strips, 2 x 4 in.*

IT IS well recognized that quality of coatings, and of finished coated products depend to a great extent on the cleanliness of the base to which the coatings are applied. There are many contaminants which must be removed before coating, among them rust, different types of heat scale, grease, oil, carbon smudge and other burned oil products, dust and dirt, alkalies and soluble iron salts and other residues from pickling and cleaning processes.

Introduction of the cold rolling process with the incidental problems brought about by the oils used in rolling and the products which these oils form in subsequent processing have made the requirements for thorough cleaning more difficult. Metallurgically clean means the absence of any materials on the surface which will stimulate corrosion and interfere with the application of a coating, thus causing imperfection or failure of finish.

Coatings whether they be metallic such as zinc, lead, tin or terne, or whether they be organic, such as paints or lacquers or enamels, or whether they be special chemical treatments are applied for some specific purpose—the purpose generally being to give added protection and sometimes decoration to the steel base. Each type of coating material has fairly definite properties to the extent that for any standard unit of thickness a rather definite amount of protection may be expected. It follows then, that if the most efficient use of coating material is to be made, certain requirements must be met.

First, the coating film should be as continuous as




*Left, reference piece of clean steel*

| | | | | | |
|---|---|---|---|---|---|
| *Strip No.* | 1 | 2 | 3 | 4 | 5 |
| *Sodium metasilicate concentration, %* | 2 | 4 | 6 | 8 | 10 |
| *Residual oil, gram per sq cm* $10^{-6}$ | 38 | 21 | 14 | 4 | 4 |

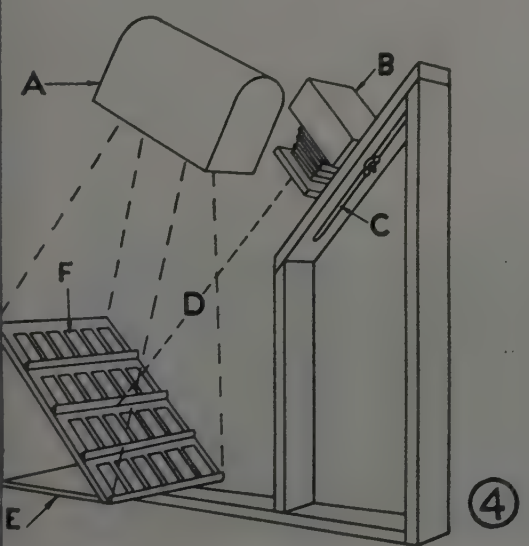
# EVALUATION

*Positive methods for determining when metal surfaces are chemically clean go a long way in taking cleaner research out of the production line*

possible, with a minimum of porosity, since protection is not realized at the points where the bare steel is exposed, except in the case of some metallic coatings, notably zinc, where the sacrificial properties of the metal may, for a short time, provide for some increased protection due to the covering over of the exposed areas. Second, the coating film should be as uniform in thickness as possible. Obviously, the total value of the coating film is only as good as its thinnest area and, while uniformity of thickness of the coating film does not depend alone on the cleanliness of the steel base, still the cleanliness of the base has much to do with uniformity. Third, the coating films should adhere to the base metal as tightly as possible.

Coating films adhere to the base metal in several different ways. In some cases chemical combinations are made with the steel base; in other cases, notably in the hot metallic coatings, alloys are formed between the coating and the base metal. While complete cleanliness of the base metal probably does not guarantee tightness of coating film in all cases, still it is one of the most important contributing factors. Thus if for no other reason than that of making the most efficient use of coating materials, the proper amount of study should be devoted to the cleaning of the base metal prior to use in production cycles.

Just what degree of cleaning is required for coating?



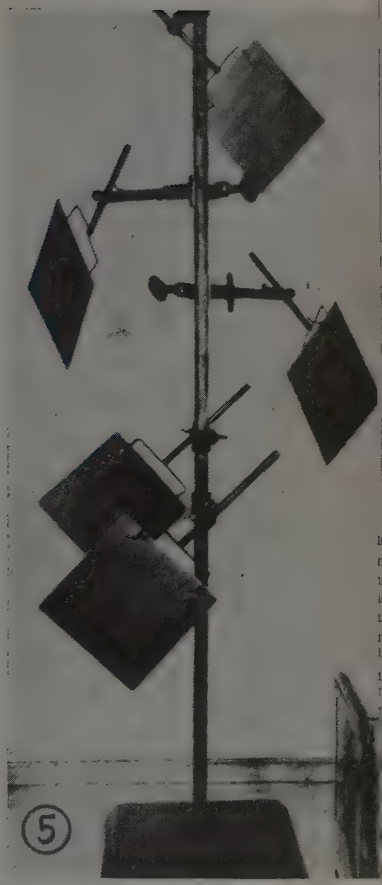




*Fig. 5 — Coating technique showing panel holder for use in spray pattern method*

This is a difficult question to answer since the property of removing oils from metals is relatively easy to recognize and evaluate qualitatively, but somewhat more difficult to evaluate quantitatively. Practically any alkali cleans most of the oil from the metal and, unless a quantitative evaluation of the residual oil can be made, the true value of the metal cleaner is left more or less as a matter of opinion. There is no doubt that a real need exists for a quantitative test that is both rapid and capable of permanent records for the comparison of cleaning products. The measurement of one or several physical or chemical characteristics of an alkaline cleaning solution is not sufficient to establish quantitatively its merit as a cleaning agent. Indications are that a performance test involving cleaning of uniformly soiled metal samples and observation of residual traces of oil appears to be the best method of studying metal cleaners. Two methods for scientifically detecting and recording oil residues on metal surfaces after standard cleaning procedures are described here. It is believed these methods will do a great deal to take "cleaner research" out of the production line.

**"Water-break" Method:** This method was used for a long time as a criterion for evaluating metal surface cleanliness. The test is based on the ability of metal surfaces to sustain an unbroken film of water when "chemically" clean. It was not adequate, since the water-break pattern was found to be dependent on the thickness of the water film. Observations have shown that smaller and smaller areas sustaining a complete water film are obtained as the water is drained from the panel. As these

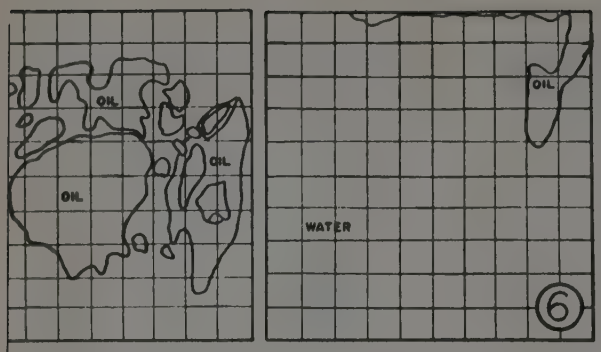



*Fig. 6—Cleaning results as sketched on ruled paper in spray pattern method. Left, cleaning index 73 (fair). Right, cleaning index 94 (good)*

factors reach a more or less steady state, evaporation of water becomes a factor in obscuring the results. As a result of these factors, it is believed that evaluations performed with the water-break test, as normally used, do not provide an adequate estimate of the efficiency of metal cleaners.

**Fluorescent Oil Method:** An important contribution in the direction of quantitative evaluation of alkaline cleaners for the removal of contaminants from metal surfaces was made by Morgan and Lankler[1] based on a semiquantitative method that involved photographing fluorescent oil residues under ultraviolet light after a standard cleaning procedure. Mineral oil fluoresces brightly under ultraviolet light. Animal and vegetable oils which do not fluoresce in their own right can be made to fluoresce by the addition of an oil soluble fluorescent dyestuff[2]. Since this white fluorescence of the various oils is proportional to amount of oil adhering to the metal surface, and since clean metal appears black under ultraviolet light, a natural scale of measurement is established for evaluating the efficiency of a metal cleaning compound. Extremities of this scale are shown in Fig. 1. With this method fine distinctions can be made between cleaning compounds, since it was established by tests that 0.000004 gram of oil per square centimeter is visually detectable.

In the experimental procedure for the fluorescent oil method metal test strips 2 x 4 in. in size are thoroughly scrubbed by hand, rinsed in alcohol and allowed to dry.

*Fig. 7—(left to right) Results obtained on panels using spray pattern method: A, poor cleaning (cleaning index 6); B, fair (cleaning index 73); C, fair to good (cleaning index 88); D, good (cleaning index 94)*

Strips of wool flannel about the size of the panels are saturated with the oil composition, the removal of which is to be studied. These oil-saturated wool strips are alternated with the metal strips to form a stack with protecting metal plates and oil-saturated wool strips above and below the stack of experimental strips. The stack of plates is placed between the jaws of a hydraulic press, and a pressure of 500 psi is applied and maintained until no more oil oozes out from the edge of the stack. At the end of this process the pressure is released, and the strips are removed and retained in a horizontal position until taken out of the stack, one at a time, for the cleaning experiment.

**Cleaning Method:** The "soaking method" of metal cleaning was used by Morgan and Lankler in their work, although it is obvious that electrolytic methods may be used. In the "soaking method" it was thought that there could be no mechanical boosting action in the process to confuse the intrinsic cleaning ability of any product. The procedure involved the use of 800 cu cm of cleaning solution contained in a 1000 cu cm beaker. The beaker was immersed in a constant temperature bath at the desired temperature and the metal test plate was hung in the beaker from a hook for the required period of time. The metal test plate, following withdrawal, was rinsed in water at 100° F for 1 min, then hung in air to dry.

**Recording Results:** The metal strips are finally placed in a rack of such a nature that the strips do not touch each other until it is possible to photograph a complete series from any given set of experiments in an apparatus such as shown in Fig. 4. The ultraviolet light source, such as that used by Morgan and Lankler, consisted of a Hanovia analytic model quartz lamp; however, any strong source of ultraviolet light which is properly filtered to remove essentially all of the visible spectrum is satisfactory. The camera is equipped with a Wratten K-2 filter, and Tri-X film, and the pictures are taken at F:4.5 with a 10 min exposure. The camera is placed approximately 30 in. from the subject facing it directly. Ultraviolet radiation is incidental to the surface of the subject at an angle of 45°, the lamp also being about 30 in. from the midpoint of the subject. The film developer used in the work is DK-60A, which is designed to give maximum contrast. The paper is Eastman's Azo F.3, on which an elon-hydroquinone developer is used. Temperature and developing time are carefully controlled in the development of both films and prints, but otherwise no special precautions are taken. In this type of evaluation the pictures taken under ultraviolet (*Please turn to Page* 106)

# Seen and Heard in the MACHINERY FIELD

By Guy Hubbard Machine Tool Editor

**MORE ON RECEPTIONING:** When I broached this subject in the July 29 issue, I aroused the interest of several people. For instance, Earl Shaner, editor-in-chief of STEEL, just back from his flying trip around the world as a member of the Pauley Mission, tells me this about receptioning as practiced in machinery plants in Manchuria.

Arriving tired, dusty and travelstained, he was given what American barbers call "a hot towel" as a picker-upper before entering the plant, this with the compliments of the receptionist.

Then—having made his tour of the plant—Mr. Shaner returned to the reception room to find not only another "hot towel," but also a setup of tea and toasted watermelon seeds — Manchurian equivalent of cocktail peanuts. Clever, those orientals!

Getting back into history, it is recalled around this office that quite a number of years ago we ran an article on performance—over and beyond the line of duty—of a certain receptionist, and the returns in the way of big business which came as a direct "pay-off" on the tact and efficiency of that guardian of the portals.

As a result of that article, a letter was received from the late Judge Elbert H. Gary, stating that it was his firm conviction based on long experience, that the receptionist holds one of the most important of all positions in a company.

And now as a result of my July 29 story I have received a letter from Giddings & Lewis Machine Tool Co. In this letter S. L. Little states that not only have I confirmed the faith of officials of that company in their "Welcome booklet," but also that I have substantiated their own good judgment through my ability to judge the kind of blondes that gentlemen prefer.

**TOOL ENGINEERS' HOLIDAY:** Company executives, postmen and bus drivers generally are supposed to have their work so much on their minds that when they do have a day off they "take their problems home with them," or go for a walk, or go for a bus ride—as the case may be. What about tool engineers?

I found out something about them a few days ago when I myself took an afternoon off to attend the mid-summer party of Cleveland Chapter, ASTE, at Pine Ridge Country Club. The weather was ideal, the site is a beautiful one and fully 100 tool engineers were there—designing machines and tools all afternoon and evening!

I had lunch with one group under the shade of the trees. Members of that group made table cloth sketches of a setup for "machining motor feet in a true plane parallel to armature shaft and at exact distance therefrom."

I joined a gallery on the golf course. Those men were making verbal drawings of an automatic machine for producing razor blades from coiled strip steel. We caught up with a foursome. It was made up of tool salesmen. They were selling tungsten carbide tools to each other—and doing better at that than at golf.

Having made the rounds of the golf course and having settled on design of nicking dies, we adjourned to the tap room, where my ASTE friends added induction hardening and a grinding, honing and stropping attachment to their razor blade machine. Work had just started on the shearing and packaging end when the dinner gong sounded.

Inspired by music of a violin-accordion team strolling among the tables in the banquet hall, conversation took a literary turn. The man on my right envisioned new chapters for his book on punches and dies. The one on my left began to dream up some articles on large volume heat treatment of tools.

Apparently those tool engineers didn't "get away from it all" out there at Pine Ridge Country Club. Of course sunshine and fresh air and companionship and good things to eat and drink, all were enjoyed. But what about games—most of them didn't play games? Oh yes they did, their game—as well as their profession—is tool engineering!

**WELL DESERVED HONOR:** One of the high spots of the 30th annual meeting of the American Gear Manufacturers Association at Hot Springs, Va., a few weeks ago, was the presentation to John O. Almen of the Edward P. Connell award, established in memory of the late president of the Falk Corp. and conferred once a year on one who has made outstanding technical contributions to the art of gear making. John has done that —and a lot more than that.

For many years, millions of people who drive motor vehicles and who ride in motor vehicles, have been benefited by the work of John Almen. Since 1926 John has been head of mechanical engineering department No. 1, General Motors Research Laboratories, Detroit. During those 20 years he has solved innumerable problems ranging from bodies to suspension systems and from engines to rear axles—including those involved in transmission and rear end gearing. He was a pioneer in extreme pressure lubricants. He has been granted at least 75 patents.

Here are just a few of many widely use automobile devices, the invention or improvement of which are involved in his impressive array of patents: Resonance intake and exhaust silencers; automatic valve adjusters; automatic transmissions and controls; and plate spring clutches.

In spite of that impressive record, John seemed just a bit flabbergasted when the moment arrived for him to stand up before the AGMA audience at the Homestead to receive the Connell award. Hesitating for several seconds, he finally spoke about as follows: "It is an honor for me to accept this award as a tribute to the generous co-operation which I have always received from my associates."

Through courtesy of AGMA I now present a one-paragraph biography of John Almen by John Almen.

"J. O. Almen was born much too long ago in a log cabin on a western prairie. Very early in life he exhibited interest in fractures when, upon observing a half moon, he wanted to take it down and fix it. Education started on a plow at the age of eight, and continued through planting, harvesting and threshing machinery. Finally he qualified as an 'expert' for a farm implement store. Later he became enamored with that new hussy the automobile, to whom except for minor digressions he has been true these many years. He also strove for an education in a district school, high school and Washington State College. He still has hopes of becoming an engineer or something."

# Low-Temperature Behavior of FERRITIC STEELS

By H. W. GILLETT
Battelle Memorial Institute
Columbus, O.
and FRANCIS T. McGUIRE
University of Kentucky
Lexington, Ky.

*Comprehensive data secured from experimental work carried out as a War Metallurgy Committee project correlates and clarifies some points of low-temperature behavior of commercial NE, SAE, and similar steels relating to composition, heat treatment, grain size, hardenability, etc., and also corroborates conclusions obtained in earlier investigations of similar nature*

PECULIAR differences in low-temperature behavior among steels and treatments shown by notched-bar tests but not equally revealed by other mechanical tests, exist chiefly, indeed almost exclusively, in ferritic steels. These differences are almost or entirely absent in austenitic steels, copper-base, nickel-base, and most other industrial alloys.

Different ferritic steels and microstructures may show like notched-bar impact values and tough fractures at room temperature or somewhat above, but as the testing temperature is progressively decreased, some steels and structures show rather abrupt drops in the temperature-impact curves, and the appearance of brittle, instead of tough fractures. This drop usually occurs over a range of temperature and the fractures within this range tend to be mixed, that is, a brittle patch or patches appear along with the tough, silky fracture.

There is no exact impact level at which the fracture changes sharply from tough to brittle, so no arbitrary impact specification can be drawn to differentiate between the types of fracture. The transition temperature range in which the change occurs cannot be exactly predicted from tests other than notched-bar tests, or from the composition, heat treatment, or microstructure of the steel. Indeed, supposedly duplicate heats of steel with duplicate heat treatments and indistinguishable structures, may behave quite differently as to transition temperature ranges and to impact energy absorbed at low temperature.

This "individuality" of heats of steel and of their response to a given heat treatment is minimized when the steels are so "finished" in melting that a "fine-grained," difficultly coarsenable, steel results and when the heats being compared have like hardenabilities.

Very considerable differences in notched-bar behavior are met in wrought steels when longitudinal and transverse specimens are compared, the latter results tending to be much lower than the former. These discrepancies are greatest in steels high in nonmetallic inclusions, or with banded microstructure. Some variation, however, is likely to exist in even the cleanest steels of the most uniform structure, unless the steel has been cross-rolled or otherwise worked to minimize directional differences. Cast steels of course do not show such directional properties.

It cannot be assumed from notched-bar data on longitudinal specimens that a given piece of steel will behave in the same fashion when the notch and the applied stress come in another direction.

Two types of conventional notched-bar specimens, each 10 x 10 mm (0.394 x 0.394-in.) in cross-section, are ordinarily used in low-temperature studies.

Except in the rare case where a "cold room" is available, the Izod impact test, in which the specimen is gripped at one end and struck on the other end above the notch, is not used for low-temperature studies because of difficulty in quickly gripping the cooled specimen and in knowing just what the temperature of the breaking section is at the instant of fracture. Instead, the "Charpy" specimen is used, since this is not gripped, but the cooled bar is merely laid on two supports, with the notch equidistant between them, and struck on the face away from the notch. The cooled bar can be so rapidly manipulated that the temperature change is small, and may be accurately adjusted so the bar is at the desired temperature at the instant of fracture.

The standard Charpy bar for room temperature use, has a round or keyhole notch, 2 mm in diameter, extending half the depth of the bar, and it was natural that the round notch should be most commonly used when making low-temperature tests. However, the sharper V-notch of the Izod bar subjects the specimen to more severe stress concentration and is therefore preferred by some operators, who employ "the Charpy bar with the Izod notch." The Izod notch, however, is cut only to a depth of 2 mm leaving the breaking section 10 x 8 mm instead of 10 x 5 mm as with the regular Charpy notch.

In German practice, the Charpy notch is moved closer to the edge, leaving a breaking section 10 x 7 mm. With these three different, widely used, notched-bar specimens, exact correlation of data becomes difficult, for the two factors, intensity of notch and size of breaking section, confuse the situation.

Any of these bars has a relatively small breaking section and larger bars would often give more pertinent information, but, for tough steels, they are beyond the range of the usual impact testing equip- (*Please turn to Page* 98)

# OIL CLEANING System

***Central purification system services seventeen automatic screw machines. Cleans 25,000 gallons of lubricating and cutting oil at cost of one refill***

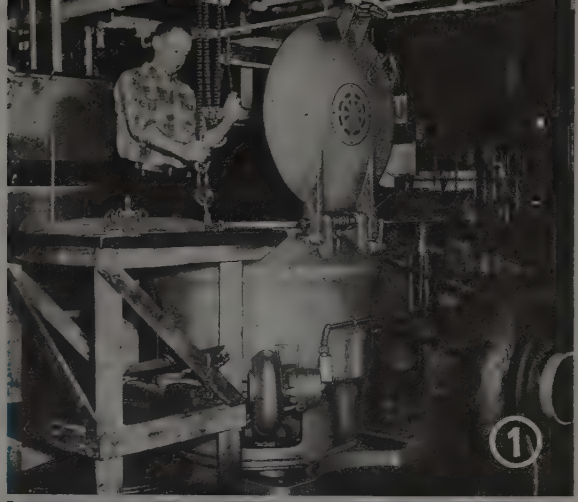
FOR years management and operators realized that contamination and abrasives in oil were responsible for many operating difficulties. In most operations using quantities of oil some attempts were made to remove this destructive contamination.

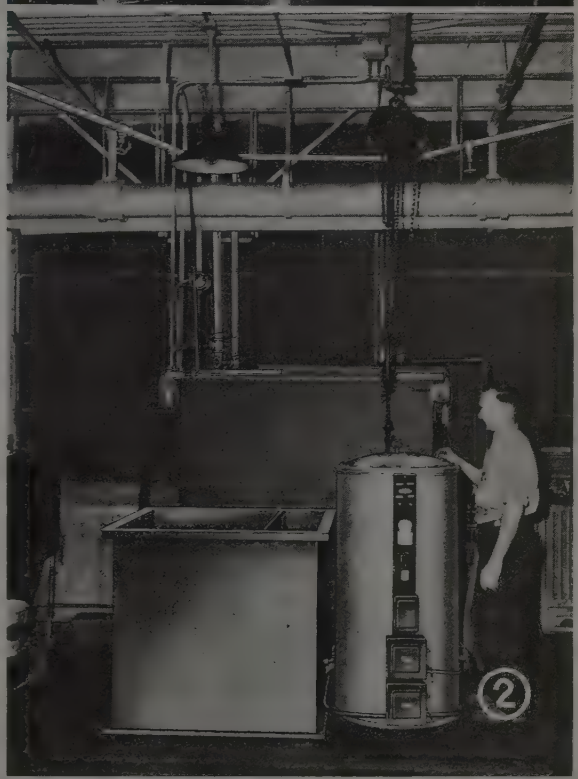
Unfortunately, many systems designed to remove contamination from oil are extremely inefficient and serve at best to strain out only the "nuts and bolts." In such instances the benefits received are negligible and have given rise to little if any enthusiasm.

Properly engineered oil purification, however, can and does do a complete job. It can and does remove even the most microscopic solids and abrasives, sludges, excess acids, varnishes and all forms of contamination. The increased operating efficiency resulting from such an installation can make the difference between profit and loss in a given operation.

An oil purification system designed and installed by Cleveland Screw Products Co., Cleveland, in co-operation with engineers from Honan-Crane Corp., Lebanon, Ind., extended tool life 15 to 18 per cent recently, and reduced oil loss to 1 per cent on seventeen automatic screw machines.

Twice during each 8-hour shift chips are pulled from each machine and taken to (*Please turn to Page* 129)



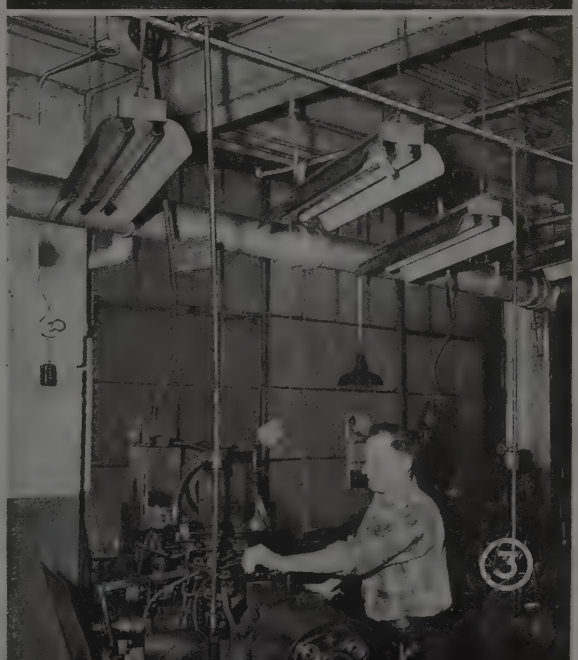




*Fig. 1—During each 8-hour shift chips are pulled from each machine and taken to this chip wringer which extracts from 25 to 30 gal of oil from each load of chips*

*Fig. 2—Dirty oil tank, front, has two baffles and screen for removing heavier particles. Honan-Crane purifier at right takes out all remaining contaminants with combination filter element. Clean oil storage tank is at rear*

*Fig. 3—Individual clean oil return line to machine is shown here, together with wall switch and valve to control oil flow*

# Magnetic Chucking

*Alternate laminations of non-magnetic steels form a holding surface that can be used to its extreme edges*

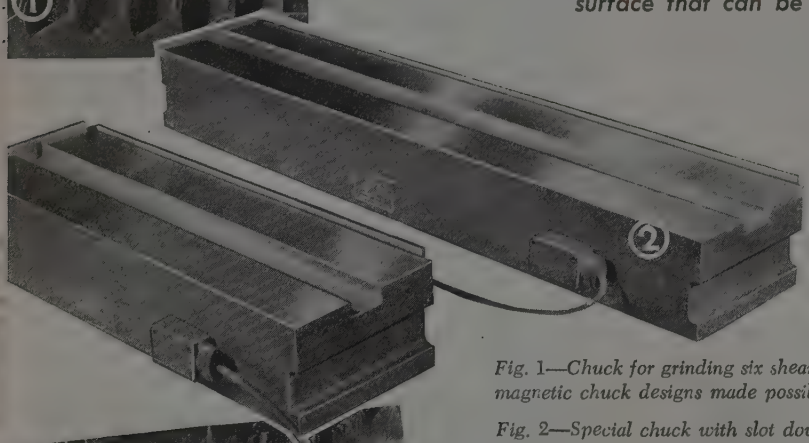


*Fig. 1—Chuck for grinding six shear blades at specific angles, one of the various magnetic chuck designs made possible with this new type of chuck fabrication*

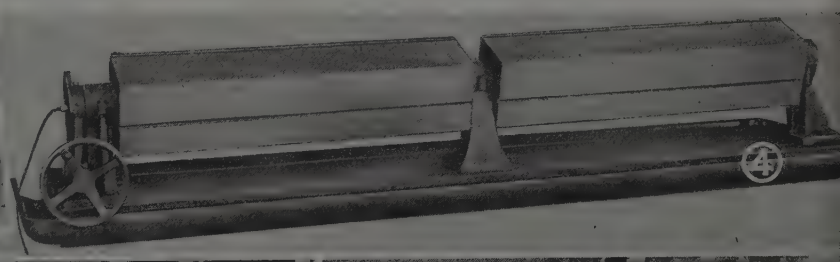
*Fig. 2—Special chuck with slot down center for holding work*

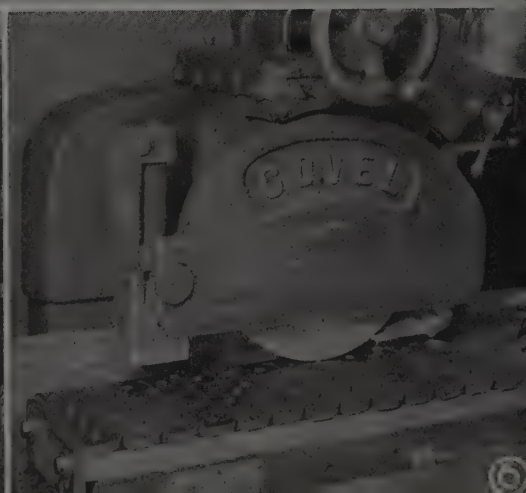
*Fig. 3—Magnetically holding automotive oil pump bodies and covers for production grinding*

*Fig. 4—Magnetic revolving knife bar which has steel laminations across length of bar, holding entire blade rigidly from edge to edge*

*Fig. 5—Hand plane body magnetic holding fixtures. Vertical lines on fixture are alternate magnetic and nonmagnetic steel laminations*

*Fig. 6—Hanchett laminated top electro-magnetic chuck holding small machine parts for grinding on a surface grinder. This operation has increased productivity by 14 pieces because of added magnetic chuck capacity*





WITH restrictions on size and weight now a secondary factor, magnetic chucks are now entering a new era. Operation is no longer confined to relatively light or small pieces. Welded-fabricated bases enable chucks to be designed and built in an almost limitless size range, as seen in Figs. 1 and 2, as well as in the other photographs accompanying this article. The welded base is stronger, more durable and also has a weight advantage over the conventional type.

Previously chucks employed a machined alloy steel slab with lead inserts separating the fields of force. The size of the work piece head was dependent on the spacing of these inserts. Holding power of the chuck was grouped in spots which faded out near the edges, meaning that only a portion of the actual chuck surface was useable.

A new type chuck developed by Hanchett Mfg. Co., Big Rapids, Mich., utilizes alternate laminations of 1/32-in. nonmagnetic and 1/8-in. magnetic steel combined to form a holding surface with a reported 22 per cent more actual capacity (Fig. 5). Because its holding power extends evenly to the edges of the chuck—due to the extremely narrow steel strips—small parts can be grouped for machining all the way to the edge, as seen in Fig. 6.

The laminated construction simplifies the problem of auxiliary parallels and blocks. By constructing all parallels to the same standard 1/32-in.—⅛-in. proportion, the problem of reduced magnetic force is eliminated. Therefore parallels and fixtures will match poles with the magnetic chucks, still maintaining the uniform holding power output of the chuck. Fig. 5 shows the magnetic holding fixtures for hand plane bodies which are ground on both bottom and sides. Laminated top chuck and auxiliary laminated parallels are used to hold parts during the grinding process. Fixture at left in Fig. 5 is for holding plane body for grinding of bottom. In Fig. 7, showing plane bodies in position, this fixture has revolved and is shown going into grinding section of machine.

The Hanchett chuck is designed so that it increases resistance of the work piece to the force of the tool or wheel, thereby decreasing slippage appreciably. The holding power is transverse to the push or pull of the tool, keeping work pieces from sliding along in the direction of the cut. This feature is said to allow heavier cuts.

Because of its all-steel construction, the top plate of the magnetic chuck may be hardened for increased service life. This type of chuck is also adaptable to other varied sizes and shapes. In Fig. 4 is a magnetic revolving knife bar. As most of this type of work is for regrinding of the bevel edge of a knife, it is necessary to set the knife so that the edge overhands the knife bar. Characteristic of the laminated type of construction is that magnetism is effective to the extreme edges. Therefore the knife is held rigidly where the operation is being performed.

Automotive oil pump bodies and covers are being held in place by magnet chucking for production grinding in Fig. 3. Here auxiliary laminated parallels machined to receive irregular surfaces are mounted on a 33-in. rotary magnetic chuck. Magnetism and de-magnetism are automatic at loading position.

Fig. 8 shows the high-production grinding of cast iron electric iron sole plates at the rate of 600 pieces per hour. Plates are held magnetically by ten 6 x 18 in. chucks which have mounted thereon auxiliary matching parallels, both of laminated construction. The current is supplied to magnetic chucks by buss bars. De-magnetization takes place after pieces pass beyond the last grinding wheel. Energizing and de-energizing here also is automatic.

A Rockford open-throat planer, equipped with two heads, is shown in Fig. 9. On its bed are four 10 x 72 in. liminated magnetic chucks.



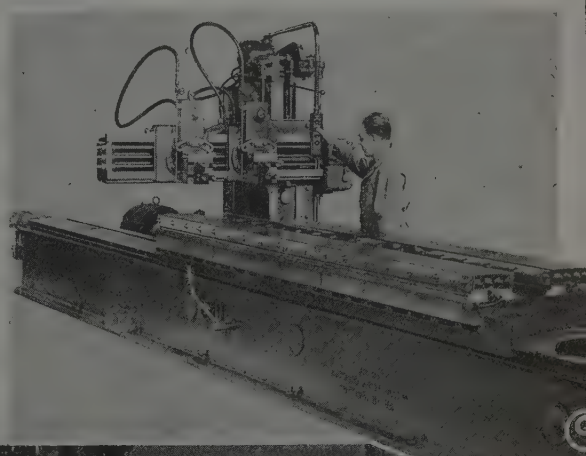
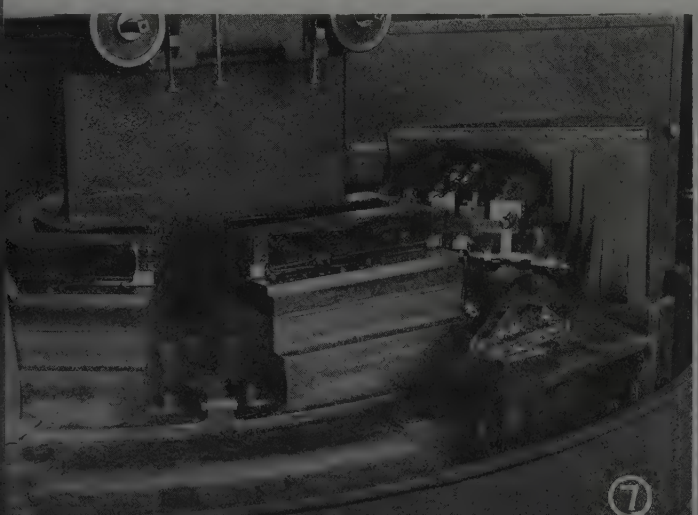
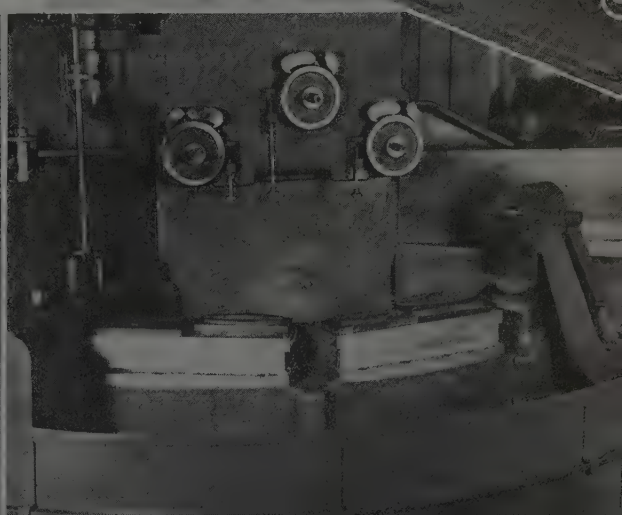


*Fig. 7—Hand plane bodies in place for grinding*

*Fig. 8—Cast iron electric iron sole plates are ground at 600 pieces per hour, held by magnetic chuck*

*Fig. 9—Rockford open-throat planer equipped with four 10 x 72 in. laminated chucks*





# Aluminum Sand Castings

*are produced in large volume and variety by parts manufacturer through use of latest general purpose equipment*

FLEXIBILITY of operation attained through the use of general purpose equipment utilizing quickly interchangeable tooling and fixtures is the technique employed by Aluminum Industries Inc., Cincinnati, for the successful execution of varied production tasks. Flexibility of operation is a "must" in a plant such as this where at any given time they produce from 8 to 10 different types of cast iron pistons; 25 different types of aluminum pistons; over 150 different intake and bimetal exhaust valves; water pumps of every description; a complete line of cylinder sleeves; permanent mold connecting rod castings for small engines and outboard motors.

As a further indication of the magnitude of varied production realized through the use of standard equipment, the aluminum foundry turns out approximately 600 different patterns of various sizes and uses 26 aluminum alloys. In fact, original parts for new vehicle models and replacement parts for all rolling stock of recent years can be produced without difficulty. To attempt to reveal the manner in which this company's know-how is wedded to standard tools to attain such diversified, mass production is not an easy matter. However, description of some of the facilities utilized in the company's foundry might well serve as a signpost as to what can be expected in production through the judicious use of the technological developments today available to manufacturers.

Photos 3, 5, 6, 7, 8, 9, and 13 were taken by Palmer for Division of Information, Office for Emergency Management.

*Fig. 1 — General view of sand foundry showing battery of sixteen 450 lb gas fired, tilting type melting pots. These pots supply molten aluminum via a network of Monorail conveyors. The new building housing the foundry has a complete system of materials handling, including cranes, hoists, conveyors and industrial trucks; illumination is provided by a system of fluorescent light units; separating the aluminum melting department from other parts of the plant is a corrugated asbestos curtain to confine the fumes and smoke. In addition to the melting pots illustrated, the department also has sixteen 1000 lb tilting type gas-fired melting pots, ten 2000 lb oil-fired rotary melting furnaces and six hearth type reverberatory furnaces in several ranges of melting capacity*

*Fig. 2—Sand molding machine of the jolt-squeeze type. Molding department is equipped with latest molding machines including squeezer type machines, jolt-and-squeeze-rollover machines, and special machines adapted in this department*

*Fig. 3—A row of jolt-squeeze molding machines for hand work. Numbered hoppers above machines contain conditioned sand. Central section of core department contains the sand core racks for handling and distributing the cores*

*Fig. 4—Important feature of the core department is a comprehensive, Jeffrey installed sand conditioning and distribution system which is in turn supplemented by an underground Jeffrey shake-out sand conveyor system with hoppers and conveyors located in a tunnel. Cores are baked in Despatch, Kirk and Blum, and Gehnrich ovens*

*Fig. 5—Worker brushing and inserting cores into the assembled mold. This is one of the many operations required before actual casting can begin*

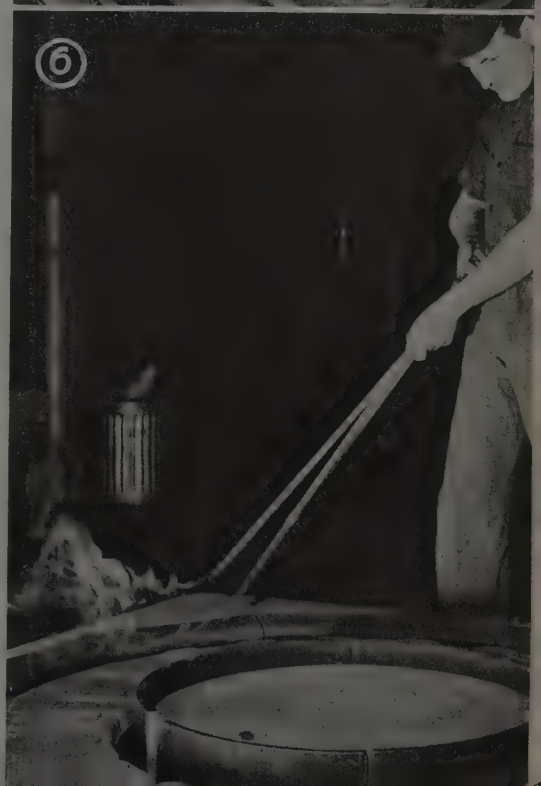


*Fig. 6—To insure against cracking when metal is poured into it, this sand-filled mold is skin-dried with a gas torch*

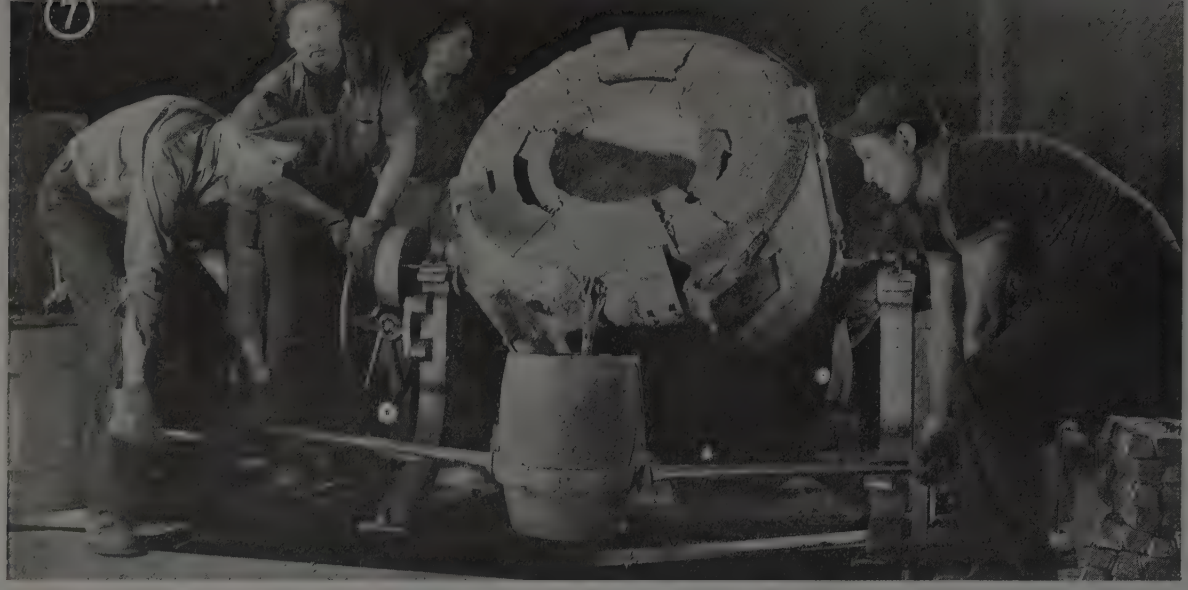


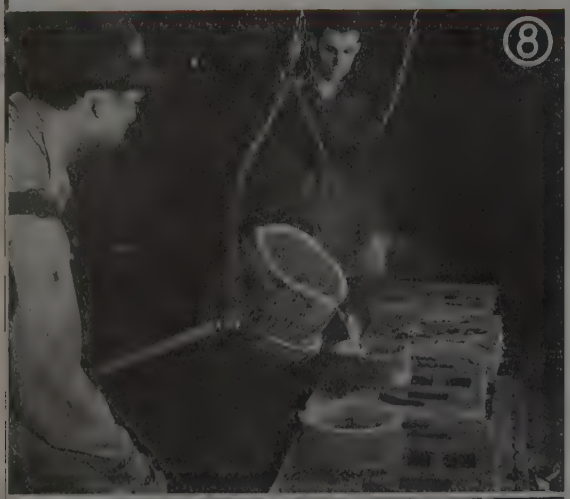
*Fig. 7—Workers tap a 450 lb tilting type crucible furnace. Further pourings will be made from these ladles which are conveyed to various pouring stations by a system of overhead Monorail conveyors. Aluminum melted is from alloy metal pigs supplied by outside concerns*

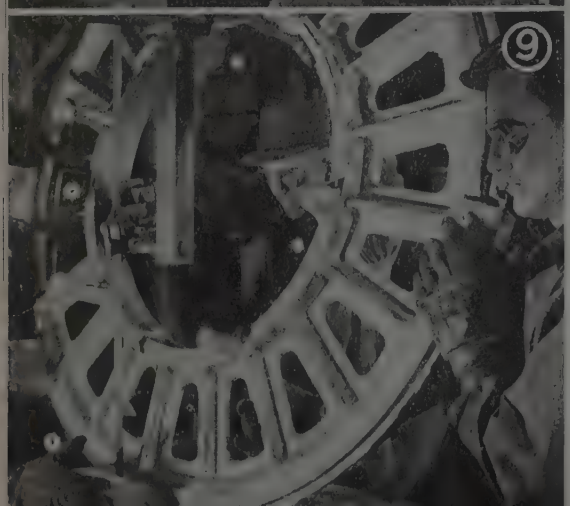
## uminum Sand Castings

*Fig. 8—Pouring of molten aluminum into molds is expedited by the use of conveyors and hoists. Pouring line employs gravity roller conveyors for moving the molds. Located in bay at the right is the molding department. To further expedite the flow of work, foundry is departmentalized so that each function is performed within a specified area. Areas set up include those for melting; permanent mold departments; core departments; molding departments; etc.*

*Fig. 9—Gates and risers are removed from a large ring with a band saw to speed production of aluminum castings*

*Fig. 10—Castings are sand blasted, in Pangborn units. Sand blast rooms employ turntables, similar to the one shown, for mounting castings*





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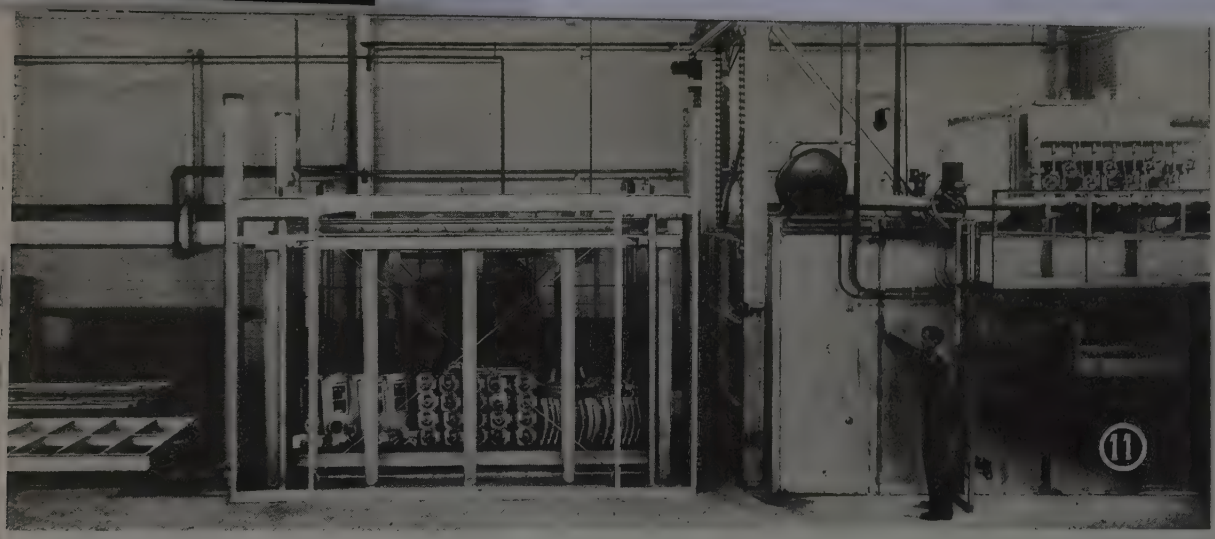
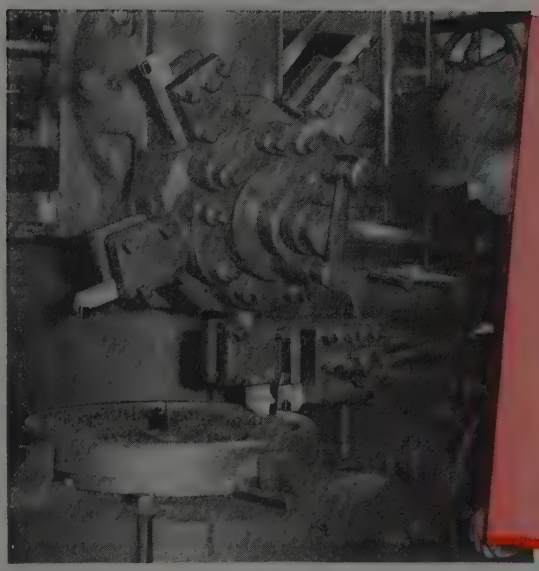


*Fig. 11—One of the larger pieces of equipment used in the heat treat department is this gas-fired Despatch aluminum heat-treating furnace with combined quenching station. Unit work space is 15 ft long, 7 ft wide and 7 ft high*

## iminum Sand Castings

*Fig. 12—Load entering quench tank after being removed from one of the two Despatch pot-type furnaces used for solution heat-treating and annealing. This department is also equipped with latest General Electric elevator type of heat-treating furnace and is combined with a quenching tank*

*Fig. 13—Large sand casting being checked to blue print specifications. Foundry has a large chemical and metallurgical laboratory which is provided with x-ray equipment, spectrographs, Magnaflux Zylgo inspection machine, etc.*



# 5 BIG REASONS WHY CARBOLOY CEMENTED CARBIDE STANDARDS get the call! IN DIESEL MANUFACTURE

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**2 BOOST HOURLY OUTPUT**

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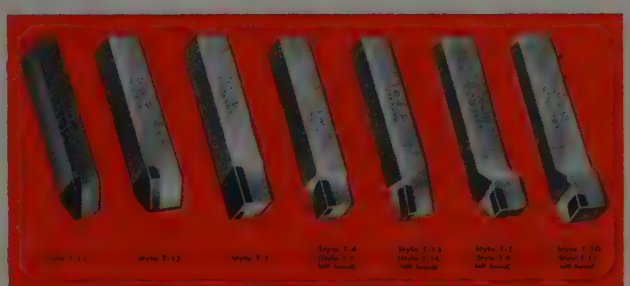
**3 OUTLASTS STEEL TOOLS**
**4 ELIMINATE EXTRA OPERATIONS**

A midwestern manufacturer of Diesel valves switched to Carboloy* Standards for machining the interiors of valve heads. A far smoother surface finish was obtained—the polishing operation was completely eliminated, with a big saving of time—and tool life was increased by 10 times.

**5 AND DO THE JOBS THAT "CAN'T" BE DONE!**

Recently a shipyard ran into trouble reconditioning Diesel crankshafts on ships of war. The chrome alloy used to build up undersize bearings proved too tough and abrasive for high speed steel, and diamond-pointed tools were too fragile and costly for the job. Lacking a grinder big enough for the operation, Carboloy* G-999 was recommended—machined satisfactorily at moderate tooling cost—and helped speed the needed ships back into service.



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# Packaged Houses

*Pre-fabricated metal dwellings that can be assembled in a few days are providing an economical solution for present housing needs*

READY-TO-ERECT housing units of steel and aluminum are helping to alleviate housing shortages in universities, colleges, and other places where housing is one of today's most acute problems. Delivered in labeled packages with necessary erection instructions, a two-bedroom house can be erected by three men in approximately 3½ days. No special tools, rigging, or equipment is needed for assembly of the standardized, formed parts.

Following V-J day, Steelcraft Mfg. Co., Cincinnati, decided that the prefabricated steel and aluminum basic barracks units they were producing just before the end of the war could be engineered into peace time housing units. The former barracks units were therefore revised into standard 1 and 2-bedroom houses, and 18-bed dormitories for colleges and universities. Each building is comprised of sections or units which can be combined into as large or small a structure as desired. For example, two units are used in the 1-bedroom house; three units are combined for the two-bedroom dwelling;

*Top of Page—*

*View showing the floor framing construction. The entire building is supported by steel post angles embedded 2 ft in the ground and resting on concrete footings. Floor level is approximately 15 in. above grade*

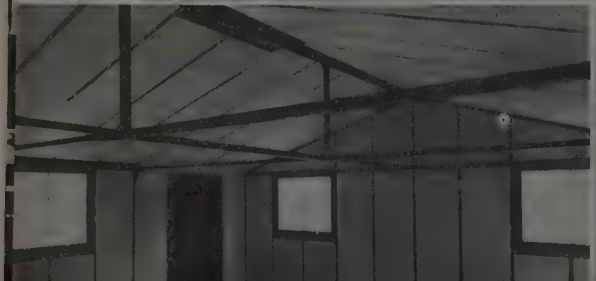
*Bottom of Page—*

*Above, left—Photograph showing entire side wall framing*

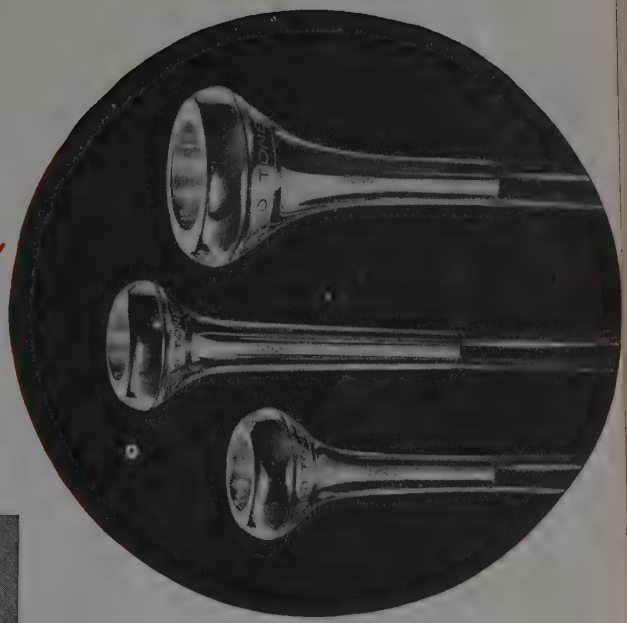
*Above, right—Wall and some of roof panels bolted into position. Large opening in side wall is ready for installation of rear door*

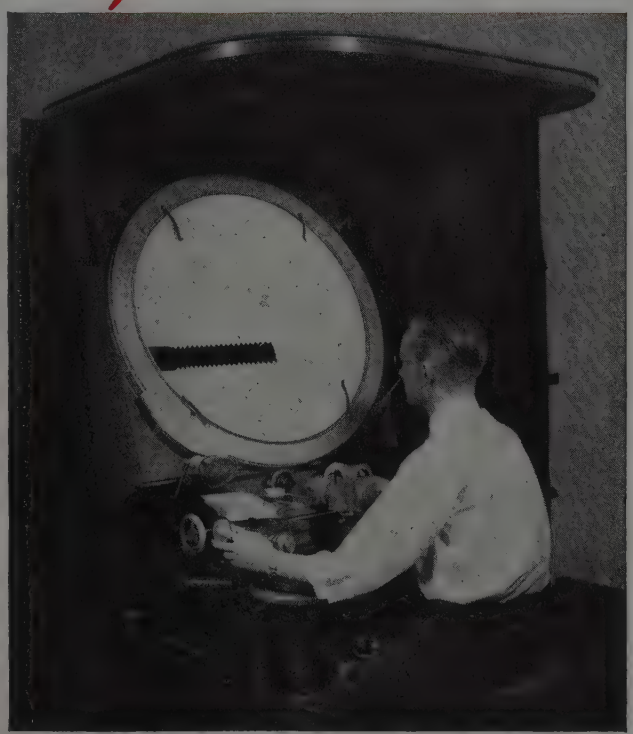
*Below, left—Interior view of completed house with walls and roof insulation, windows, and rear door in place. Note roof ventilator*

*Below, right—View showing completed house ready for occupancy. Garage shown here is also pre-fabricated*



# Scarcely THICKER THAN A Hair!





Photographs courtesy of C. G. Conn, Ltd.

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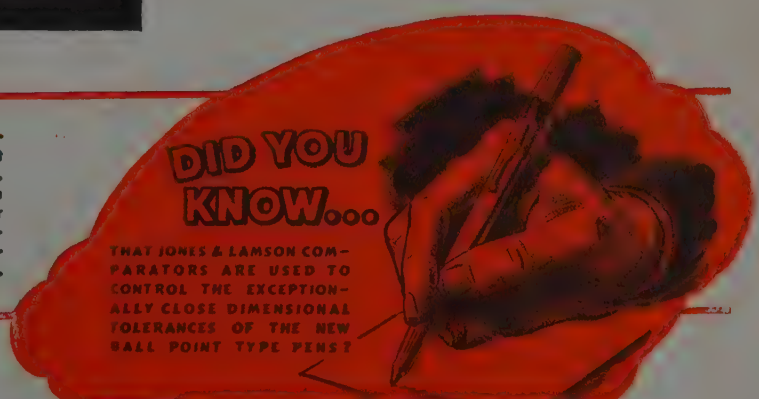
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Manufacturer of: Universal Turret Lathes • Fay Automatic Lathes • Automatic Double-End Milling and Centering Machines • Automatic Thread Grinders • Optical Comparators • Automatic Opening Threading Dies and Chasers • Ground Thread Flat Rolling Dies

two units make up the front and back, and four supplementary interior units furnish the desired capacity for an 18-bed dormitory.

Each unit is 20 ft wide and 8 ft long with an inside height of approximately 7 ft. Framing consists of fabricated steel parts protected by two coats of baked-on-paint. Roof and walls are formed with panels of 0.025-in. thick aluminum by bolting them to the wall and roof framing. Steel frame supports are provided for the plywood or other wood flooring. The interior walls and ceiling consist of ½-in. thick cut-to-size insulation which is attached to the steel framing by means of clips.

In addition to manufacturing steel and aluminum houses and dormitories, the company is also producing pre-fabricated galvanized garages, farm and industrial buildings. These too are designed along the unit idea.

## ASA Offers New 1945-46 Yearbook

Information about officers and members of the board of directors, of the standards council and other policy forming committees of the American Standards Association is contained in the association's 1945-46 yearbook, the first published since 1938. It also includes the constitution and by-laws of the ASA and information about the set-up of the organization and how standards are developed.

The center section of the book is devoted to a listing of approved American standards and projects under development. Names of officers and members of active technical committees are listed.

Copies may be obtained free of charge by writing the association at 70 East 45th street, New York 17.

## Red Book of Great Lakes

*Great Lakes Red Book;* paper, 174 pages, 3 x 4¾ inches, published by Penton Publishing Co., Cleveland 13, for $1.

This volume, of vest-pocket size, contains a complete port directory, shipyard directory, dimensions and capacity of bulk freighters for the 1946 Great Lakes season. More than 1500 vessels available for service are listed, with management, chief operating personnel, technical data, including keel length, beam, depth, distance between hatches and carrying capacity at 20-foot draft.

An alphabetical list makes it easy to find the name of owner, captain or engineer of each ship. The directory is the recognized authority on Great Lakes fleets.

## Directory of Canadian Manufacturers, Products

*Canadian Trade Index;* cloth, 858 pages, 6½ x 10 inches; published by Canadian Manufacturers' Association Inc., Toronto, Ont., for $6.

The 1946 edition of this annual publication contains an alphabetical list of approximately 9000 manufacturing firms, with addresses, branches, brands, trade names, cable addresses and foreign representatives. It also presents a classified list of thousands of industrial products with names of firms manufacturing them. An export section gives basic information in regard to government services, foreign trade controls, methods, financing, price quotations, British Empire tariff preferences and a list of overseas supply missions in Canada and the United States. A French index of products is also included.

Revision from the preceding edition has been thorough, with 401 new firms added, 140 deleted, 142 changes in names, 317 changes of address, 93 new classifications.

## Power Brush Adjustments

MANY adjustments can be made in power brush specifications or operating conditions to achieve different or modified results. For example, if observation shows that a brush is working too fast, any of the following courses recommended by Osborn Mfg. Co., Cleveland, are open to the operator:

1. Reduce surface speed by reducing revolutions per minute or outside diameter of brush
2. Reduce filament diameter
3. Reduce fill density, fill packing
4. Increase trim length

If brush is working too slowly, operator can:

1. Increase surface speed by increasing outside diameter of brush or speed of operating motor
2. Decrease trim length and increase fill density of brush
3. Increase filament diameter

When action of brush peens the burr to an adjacent surface rather than removing it, one of the following steps can be taken:

1. Decrease trim length and increase the fill density of brush
2. If wire brushes are being tried and tests indicate metal of part too ductile, burr is peened rather than removed, a change to a non-metallic brush used with burring compound should be made

To obtain a higher polish, operator can:

1. Decrease trim length and increase fill density of brush
2. Decrease wire diameter
3. Use non-metallic brush if tests with wire indicate required high polish cannot be obtained

To reduce surface polish required to a "satin" or "suede" type finish as in the case of non-metals, it is possible to:

1. Increase brush's trim length
2. Reduce brush fill density

If brushing action is not sufficiently uniform, operator can:

1. Increase brush flexibility
2. Devise hand-held fixture or machine which will avoid irregular hand manipulations

## Alemite Division Sets Up Lubrication Training

A national program of lubrication training schools in upwards of forty cities, where returned G. I.'s and others will be trained as lubrication specialists, was announced by the Alemite division of the Stewart-Warner Corp., Chicago. It is the culmination of plans begun almost two years ago for training returned veterans and will extend over a period of several months. Each Alemite distributor will recruit students and conduct classes in his own territory.

In addition to learning the mechanics of actual lubrication, men attending the schools will be given instruction in service merchandising, record-keeping, customer-contact and sales promotion, lubricant chemistry and selection, and equipment care and maintenance.

## Drawing Stainless Steel

In the article, "Deep Drawing and 'Bulging' Stainless Steel" by J. E. Obernesser, general superintendent, International Harvester Co., Chicago, it was stated that dies are lubricated with No. 32 drawing compound supplied by the L. R. Kerns Co., Chicago. The latter company reports that No. DP 1490 drawing compound actually is used. The article appeared in the July 1, 1946 issue.

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# ENGINEERING NEWS *at a glance*

HEAVY oxide coating, known as treatment R, affords magnesium alloys good abrasion and corrosion resistance. Developed by American Magnesium Corp., Cleveland, finish is produced by anodic oxidation of the article in a sodium hydroxide electrolyte followed by sealing in a chromate solution. In appearance, it is hard and smooth, and can be made in uniform thickness as high as 0.0006-in.

FORMAL re-opening of General Electric Lighting Institute at Nela Park, Cleveland, has now been set for Sept. 9 rather than for the earlier date reported in these columns. Unforeseen labor difficulties and material shortages forced postponement of the re-opening. Elaborate rededication ceremonies have been formulated to celebrate the occasion.

TWENTY-story office building soon to be erected by Aluminum Co. of America at Park avenue and 58th street, New York, is reported to be the first building in the world to employ a new type construction embodying an aluminum-faced curtain wall. In fact, the entire facade, with exception of the window areas, will be of aluminum.

EXPECTED to play an important part in postwar automotive business is a bearing now in production at the plant of Cleveland Graphite Bronze Co., Cleveland. Intended primarily for heavy-duty applications in gasoline and diesel engines for trucks, buses and tractors, the development is described as an aircraft type product, consisting of a steel back, an intermediate layer of special copper-lead alloy and a thin surface layer of a soft bearing alloy. Latter is an alloy of three metals which are co-deposited by high precision automatic electroplating equipment, employing processes developed by company engineers. Plated layer, about 1/1000-in. thick, is reported to give a bearing surface of high load-carrying capacity and good fatigue life, and also aids the bearing to break in properly. The bearing, called Clevite 77, was specified recently for use in its 1947 model passenger cars by one of the largest producers of motor cars.

EACH passenger receives 23 cfm of fresh air instead of 9 cfm when railroad passenger cars are equipped with activated carbon air recovery panels developed recently by W. B. Connor Engineering Corp., New York. Units convert one half of the recirculated air of each car to fresh air which, when added to the outdoor air entering the car, provides the amount of air mentioned above. In addition odors are held below point of human detection, the air-born gases being simply extracted by the carbon. Panels consist of light-weight metal frames housing a battery of perforated tubes holding the specially treated activated carbon.

STEAM capacities of present boilers may be increased as much as 100 per cent by taking advantage of a circulatory system devised by John Phillips Badenhausen Inc., Philadelphia. System is said to be applicable to any Stirling type boilers, straight tube boilers and certain others commonly in use without the expense of new buildings, foundations, fuel bunkers or ash-handling equipment.

GERMAN researchers successfully developed a recoil fluid for use in low temperatures by adding a sulfonamide of low molecular weight to the regularly used mixture of triglycol, ethylene glycol and water, technical investigators of the Department of Commerce revealed recently. Viscosity of the recoil fluid at low temperatures was not too high to maintain the high specific gravity necessary for brake action. In addition, synthetic oils of good viscosity index, but poor thermal stability, also were prepared by the Germans by copolymerization of tetrahydrofuran and ethylene oxide in the presence of ferric and thionyl chloride. One synthetic oil, produced irregularly, and in small quantities, was used as a gear oil and for machinery lubrication at temperatures below 280° C. It is not miscible with petroleum oil.

INSTALLATION of a gas burner on a slitting machine was found to eliminate loss due to breakage when slitting silicon sheet steel at the East Springfield, Mass. plant of Westinghouse Electric Corp. Burner is attached to the front of the slitter and connected to the shop air and gas lines. Before the steel enters the slitter it is fed over the burner which is adjusted to heat the metal to proper working temperature.

WATER-injection — that innoculation that gives fighting planes extra zip, now can be applied to civilian vehicles, trucks, autos and other engine powered units. At Thompson Products Inc., Cleveland, officials revealed development of a device, called the Vita-Meter, which employs the principle in connection with lower octane fuel. It shoots a jet of alcohol and water automatically into the carburetor injection stream at times of engine strain, boosting power and providing the effect of gasoline 12 octane numbers higher than that used. In addition, it prevents or reduces engine knocks by providing cleaner engine performance.

ALTHOUGH design of the needle bearing does not provide for thrust capacity, it can be successfully applied in conjunction with thrust washers to carry light thrust loads, it was learned from Torrington Co., Torrington, Conn. With proper lubrication, a friction washer or other plain bearing may also be used to carry heavier thrust loads. Where heavier thrust loads are encountered, it is often possible to combine the needle bearing with another antifriction bearing to carry the thrust load, and utilize the high radial capacity of the needle bearing for the radial load.

NEW life is said to be injected in oil wells with the use of a new plastic plug that effectively seals the wells against intrusion of natural gas. Extensive tests conducted by Monsanto Chemical Co., St. Louis, and Oilwell Chemical Service Co. of Fort Worth, Texas, indicate the development returns the average well to its normal production after its allowable output has dropped to as low as one barrel daily. The plastic, a resinox phenoliic resin, was used successfully as deep as 11,500 ft underground. It is introduced

into the shaft as a liquid which permits maximum penetration, and hardens after it permeates the porous rock through which gas is filtering.

"GULPER" tool which literally gulps up pulverized materials such as metal, charcoal, chemicals, coal dust and other minerals is one of the reasons why capacities up to 5 tons can be handled by the pneumatic conveying equipment presently manufactured by Spencer Turbine Co., Hartford, Conn. Consisting of a vacuum producer, separators and vacuum lines, the direction of the equipment can be changed at will—from vertical to horizontal, or on a curve. Material conveyed is picked up without causing a dust hazard. Secondary air supply permits the open end of the gulper tool to be buried directly into the material.

RUST-preventing agent now being supplied by Pennsylvania Salt Mfg. Co., Philadelphia, protects metals for short periods—before they are painted, enameled or between machine operations, it was revealed. Consisting of an inorganic salt mixture, it is used in a water solution with a concentration of 2 to 4 per cent. In addition, it requires no rinsing before painting.

NEW 1947 model industrial and commercial unit heaters are currently in production according to a report received from Modine Mfg. Co., Racine, Wis. In constructional design, the new units incorporate improvements such as the integral, all-brazed copper condenser. Copper tubes and headers of the heaters are brazed automatically into rugged, pressure-resisting units. In addition, copper fins are mechanically and metallically bonded to tubes. Bends in each tube are designed to absorb expansion strains, and castings are acoustically insulated for quiet operation.

FROM Indianapolis, P. R. Mallory & Co. Inc. reports it is now possible to obtain unusually heavy deposits with desirable hardness, brilliance and corrosion resistance with the improved rhodium plating it developed recently. Improved process is said to assure freedom from shadows, pin holes and blisters normally accompanying heavier coatings.

SPEAKING before the Industrial Manufacturers' Association recently, W. E. Borbonus, president, R-S Products Corp., Philadelphia, told members that among the tax reforms the industrial furnace manufacturers will continue to strive for will be the provision of a 6-year carry forward of losses, accelerated depreciation of capital goods purchases, elimination of double taxation on dividends and liberation of the relief provisions of section 721 and 722 of the Revenue Act. He stated that the Tax Adjustment Act of 1945 and the Revenue Act of the same year represented steps in the right direction, but that furnace manufacturers still had much ground to cover. Mr. Borbonus is chairman of the association tax committee.

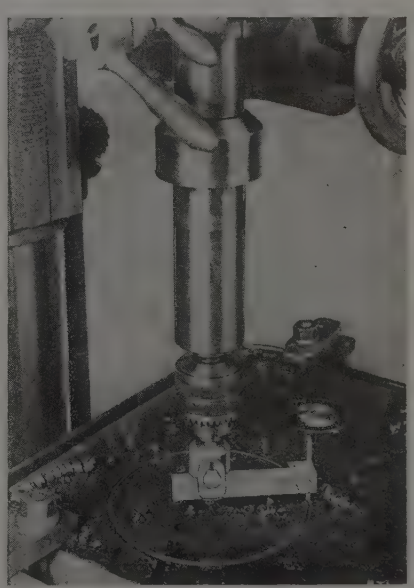
BACKED by experience of more than 25 years of production, the Bureau of Mines now can furnish an uninterrupted supply of helium for industrial and medical uses and still continue to meet demands of military and government agencies, it was learned in Washington recently. Wartime expansion of the Bureau's production facilities at plants in the Southwest elevates helium from its 1915 place as a laboratory curiosity, costing about $2500 per cubic foot, to its present position of abundance among the nation's resources costing about 1 cent per cubic foot.

SIMPLE scientific fact that pieces of carbon when compressed will conduct electricity better than when not under pressure made it possible to use resistance welding in plants far from high capacity power lines, John D. Gordon, general manager, Progressive Welder Co., told members of ASME at their semi-annual meeting in Detroit recently. Answer to the problem obviously was the storage of electrical energy in some manner in the time interval between welds, he said —the most obvious method of storing energy being the storage battery. No one until recently, however, found any way of interrupting the enormous low voltage currents when using batteries. The answer was discovered finally in the "carbon pile rheostat."—a very common device but not previously thought of in this connection. The device interrupts current flow simply by releasing pressure used to press two disks of carbon together.

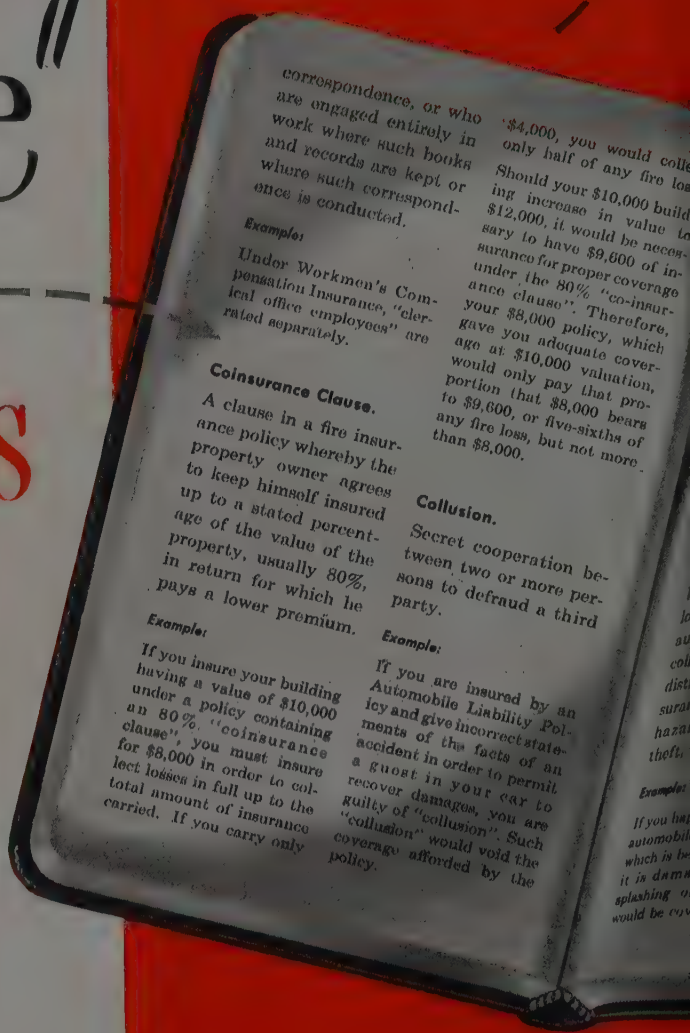
CURRENT necessary to flash weld aluminum is around 100,000 amp per square inch compared to the 20,000 to 30,000 amp per square inch usually required when welding mild steel. Change in upsetting pressure, according to Sciaky Bros., Chicago, while in the direction indicated by the relative physical properties is modified by temperature considerations so, actually, optimum upset pressure for joining aluminum is higher than minimum value that can be used for a corresponding cross section of mild steel.

FLEET of trucks, a jeep, trailers and fork lift trucks—in other words—automotive transportation is now being used to speed materials and personnel in the plant of Marion Power Shovel Co., Marion, O. The new "linking" system was made possible by construction of nearly 2 miles of paved roadway recently to connect the various plant buildings of the company. According to M. E. Montrose, president, other phases of the company's rehabilitation and modernization program are progressing rapidly. New machine tools and other facilities are being installed in a number of departments.

IN Beverly Hills, Calif., Bruno Tools revealed development of this all-purpose adjustable hole-cutting tool that cuts smooth large holes in steel, brass and aluminum quickly, cutting them to any diameter from 1⅞ to 8 in. Designed to operate in any standard drill press, it cuts through steel thicknesses of ¼-in., and 1½-in. in other softer materials. Tool consists of a combination drill and pilot embodying a high-speed cutting blade. Its Wedge-lok blade holder permits cutting edge to recede or yield from work while maintaining steady pressure and feed



# "Coinsurance Clause"



correspondence, or who are engaged entirely in work where such books and records are kept or where such correspondence is conducted.

*Example:*

Under Workmen's Compensation Insurance, "clerical office employees" are rated separately.

**Coinsurance Clause.**

A clause in a fire insurance policy whereby the property owner agrees to keep himself insured up to a stated percentage of the value of the property, usually 80%, in return for which he pays a lower premium.

*Example:*

If you insure your building having a value of $10,000 under a policy containing an 80% "coinsurance clause", you must insure for $8,000 in order to collect losses in full up to the total amount of insurance carried. If you carry only $4,000, you would collect only half of any fire loss.

Should your $10,000 building increase in value to $12,000, it would be necessary to have $9,600 of insurance for proper coverage under the 80% "co-insurance clause". Therefore, your $8,000 policy, which gave you adequate coverage at $10,000 valuation, would only pay that proportion that $8,000 bears to $9,600, or five-sixths of any fire loss, but not more than $8,000.

**Collusion.**

Secret cooperation between two or more persons to defraud a third party.

*Example:*

If you are insured by an Automobile Liability Policy and give incorrect statements of the facts of an accident in order to permit a guest in your car to recover damages, you are guilty of "collusion". Such "collusion" would void the coverage afforded by the policy.

# EMPLOYERS MUTUALS

**(OF WAUSAU)**

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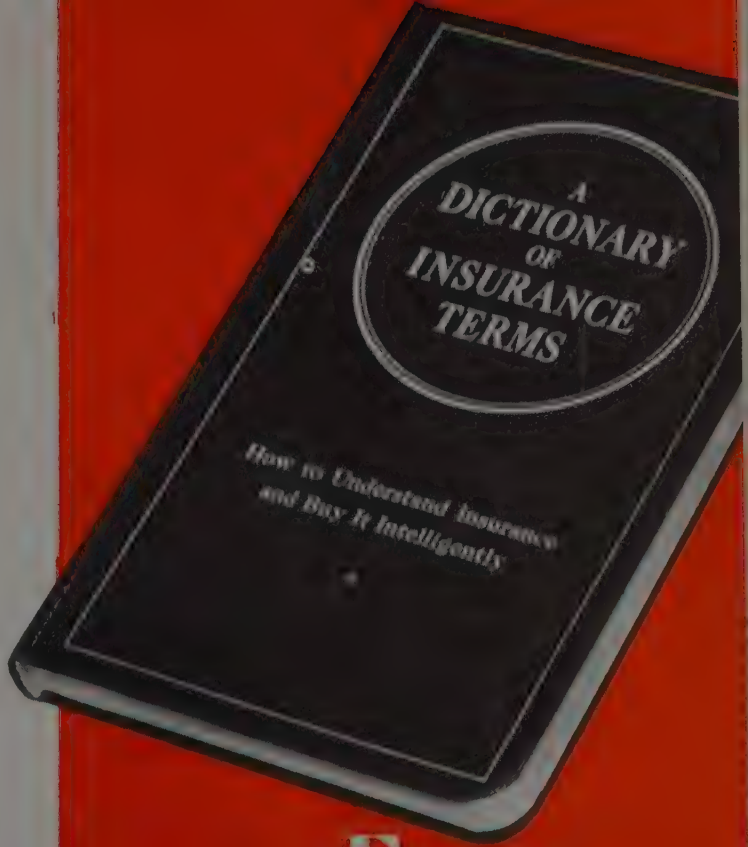


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# FREEZE FITTING of Auto parts

*Mechanical refrigeration used in assembly line to shrink cylinder block valve inserts 0.002-in. at 120° F*

COLD treating, for some time employed to supplement heat treating in the hardening of metals, was recently adapted to the assembly line at a Detroit automobile manufacturer's plant. Installed directly in the production line, mechanical refrigeration equipment is being used to chill-shrink steel valve inserts for fitting into cylinder blocks.

According to the Refrigeration Equipment Manufacturers Association, inserts chilled at minus 120° F shrink 0.002-in. and are automatically ejected from freezing unit as illustrated in Fig. 1. In room temperatures, the inserts expand to normal size and become a permanent part of the block. As shown in Fig. 2, inserts are installed at the rate of 360 per hour.

In the cold treatment of metals, sub-zero temperatures are applied to assure hardness and uniformity. Temperatures varying between minus 100 and 120° F are said to accommodate all treatments. Time required to cold treat metal also varies according to the material. In both ferrous and nonferrous metals, a time cycle alternately subjecting parts to heat and cold, is required to stabilize the metal completely.

Although from 2 to 5 cycles are recommended, the exact number depends upon the degree of stability required. The final cycle should be followed by a draw at temperatures of from 200 to 300° F.

Production was increased and costs reduced through the cold shrink fit assembly of airplane landing struts and of a bushing in the piston of a diesel engine. Low temperature unit used to assemble a bevel gear into a spline shaft permitted fitting of the gear with a hand-operated arbor press. Warping is said to have been prevented by cold-shrinking a cast-iron cylinder liner into an aluminum engine body.

During the war, cold treating of close fitting parts of aircraft permitted these parts to work more freely in high altitudes where temperatures approach the sub-zero levels.

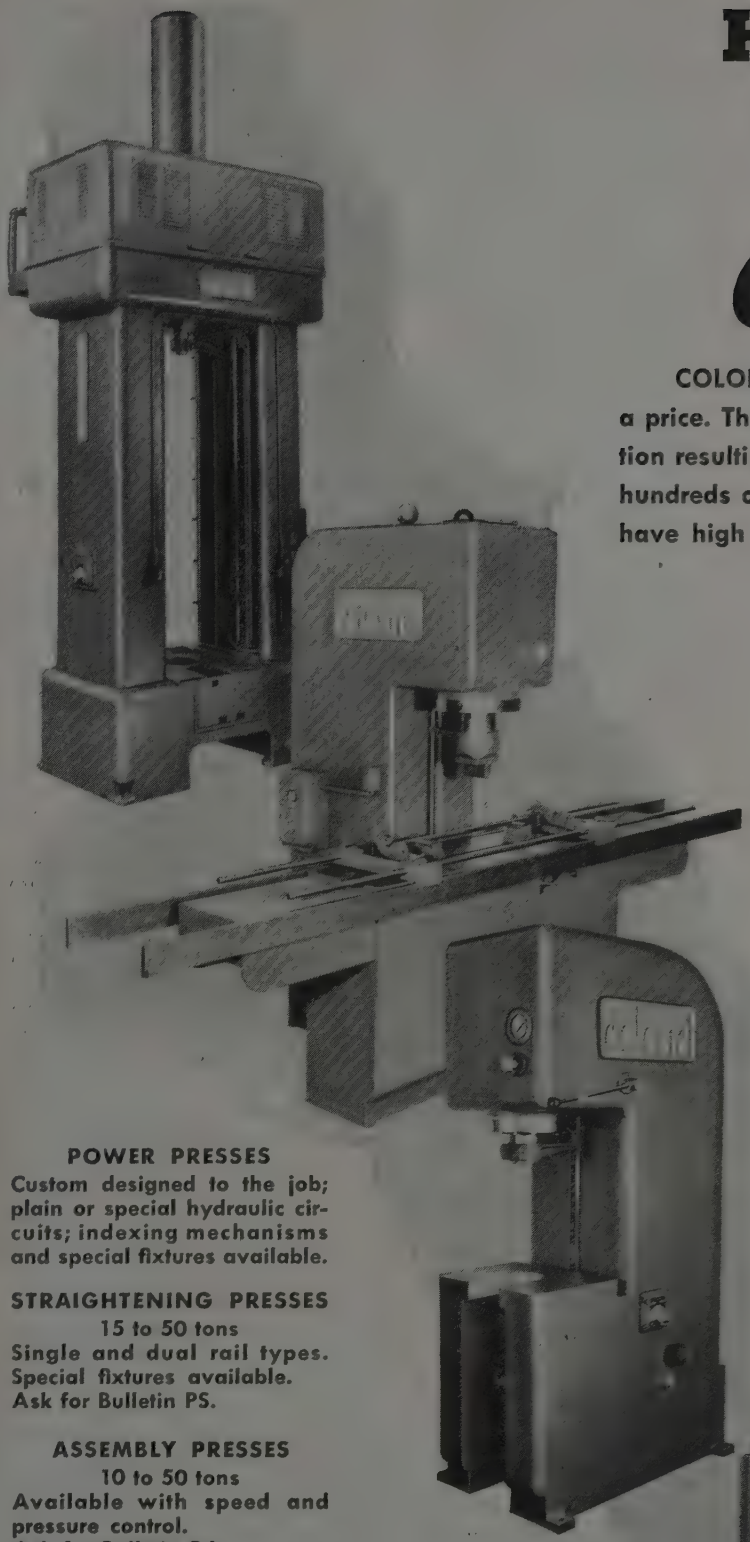
*Fig. 1 (left)—Refrigerating cabinet in front of workman chills, automatically ejects valve inserts at minus 120° F, shrinking them 0.002-in.*

*Fig. 2 (above)—Shrunken inserts are fitted into cylinder blocks at the rate of 360 parts per hour. Inserts expand to normal size and become permanent part of engine block*

# HYDRAULIC PRESSES

by

*Colonial*



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Special fixtures available.
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Available with speed and pressure control.
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Available with speed, pressure and dual safety controls; pulldown attachment.
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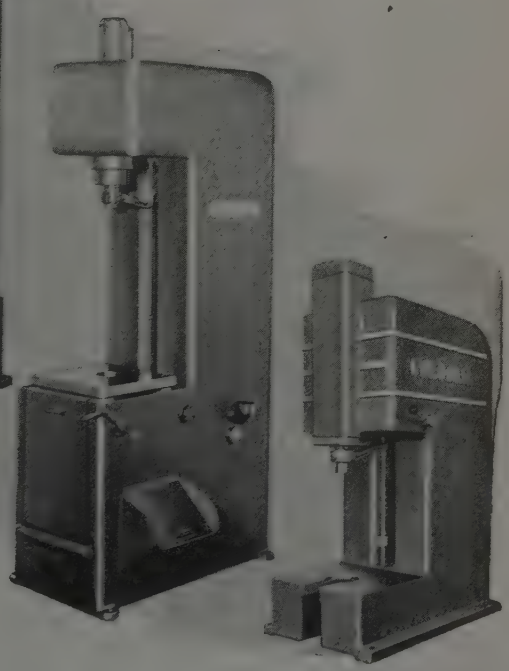
**"JUNIOR" PRESSES**
1 to 4 tons
Available with pedestal and with straightening or pulldown attachment.
Ask for Bulletin VJ-1.



## Ferritic Steels

(*Continued from Page* 76)

ment. Double-width bars, 20 mm wide, giving a round-notch breaking section of 20 x 5 mm or a V-notch section 20 x 8 mm, or even triple-width bars, are sometimes used on steels of low and intermediate toughness. Despite the German practice of reporting data in terms of energy absorbed per square centimeter of breaking section, calculating results in such fashion does not correct the results to a comparable basis. Data from one notch and section are not convertible to any other notch or section.

Still more important, no laboratory bar gives data convertible into impact energy absorbed by an actual part in actual service. For reliable information on actual parts, the actual part should be tested, full size and with its own actual system of stress concentration. Hence, the choice of one bar over the other for research or test purposes does not seem a matter of great importance.

The V-notched bar is often credited with greater selectivity and with more readily showing the transition temperature through the appearance of high and low values on duplicate specimens tested at that temperature. However, in the present work the round-notched bar gave many clear indications of a transition temperature range. Hoyt[1] remarks that "For tough metals, the Izod V-notch is too shallow for a true notched-bar test, and gives fictitiously high impact values."

On the basis of comparative tests in which no superiority, for present purposes, was exhibited by either bar, and because there are more published low-temperature round-notched bar data available for comparisons[2] than with the V-notch, the round notch was used in the present work. Only single-width bars were tested in this investigation. Correlation of sub-size, and of double- and triple-width specimens, with transition temperature ranges would have been interesting, but so great a multiplication of the already voluminous data was not feasible. Some data on double-width specimens are given from other sources.

The notched-bar test is an artificial, or conventional, test which imposes restraint upon deformation during fracture, with the development of multiaxial stresses. The energy absorbed is governed by the degree of restraint and by the intensity of the multiaxial stresses. This restraint and these multiaxial stresses are not the same in different size specimens or with different notches. Hence, no particular specimen can be chosen that will certainly represent the stress conditions of an actual part in service. Since parts in service are commonly much larger than the conventional notched-bar specimen, those parts, if severely notched, may fracture in brittle fashion when made from steel with a given microstructure, even though the steel with that structure is evaluated as tough by the conventional test.

Conversely, a part in service that is not severely notched, or that is small in section, and has less restraint upon deformation, may give a tough fracture when the conventional test shows a brittle fracture. The quantitative figures from a notched-bar test, therefore, do not give a sound basis for engineering design. Passing or failing to pass an arbitrary impact specification by a particular lot of steel carries no certainty of survival or failure of an actual part made from that steel in actual service.

Single-blow notched-bar test results give no indication whatever of notch sensitivity or lack of notch sensitivity, under repeated stress. Hence, notched-bar test results form no basis for approval or condemnation of a steel or structure for service under conditions of notch fatigue. The low-temperature notched bar test, however, does reveal differences among steels and microstructures not revealed by other mechanical tests.

Conventional notched-bar specimens, tested at low temperatures, give a purely qualitative appraisal as far as engineering design is concerned, but one that may throw light on the metallurgical causes for the differences met, which in turn may lead to improved control of melt-finishing practice and to selection of heat treatment, that will be useful from the engineering point of view in relation to low-temperature service. Nevertheless, even the maximum of such improvements cannot be expected to produce material able to withstand the most severe conditions of multiaxial stress without fracture. Recognizing that the tests are of a conventional or artificial nature, the production of steels and structures that show "tough" low-temperature notched-bar behavior under the arbitrary test conditions, is favored by various factors, notably by fine grain, by full martensitic quenching and tempering back, (but neither to extreme softness nor extreme hardness,) and by low carbon content.

Because the conventional specimens are small in section, not only is there the size effect to consider when discussing an actual part, but there is a further size effect in that the cooling rate at the center of a large piece, during normalizing or quenching, is very different from that of a small piece like the conventional notched-bar specimen, so very different metallurgical structures may appear and very different notched-bar behavior be found. Notched-bar data from pieces heat-treated in small sections are, therefore, not reliable for appraisal of the behavior of larger heat-treated specimens or parts. Practically no data are available on notched-bars from the centers of large sections.

Considerable evidence has been accumulated in the present study, that slack quenching, producing a martensite, bainite mixture, is deleterious. Slack quenching, such as occurs in the interior of a large section of a steel of low hardenability, gives bainite structures in the interior. On tempering, the interior may be little different in hardness from the fully quenched martensitic and then tempered exterior, and the microstructure may not be very clearly distinguishable, yet the low-temperature behavior of the core may be much impaired.

The production of pure martensite throughout a quenched section is rare; the martensite will be accompanied by some bainite on the one hand, or by some retained austenite on the other. The effect of retained austenite on notched-bar behavior may be different at room

**DUMP TRUCK TRAILER: "Fifth wheel" built as an integral part of the design of this welded heavy-duty 11-ton capacity trailer is so arranged that it can be mounted easily in the bed of any standard dump truck body, as shown here. Main members of unit, designed and built by Mead Machine & Iron Works, Warren, Pa., are constructed of 8-in. H beams with outside members consisting of 8-in. channel. Photo is reproduced through courtesy of Lincoln Electric Co., Cleveland**

4606

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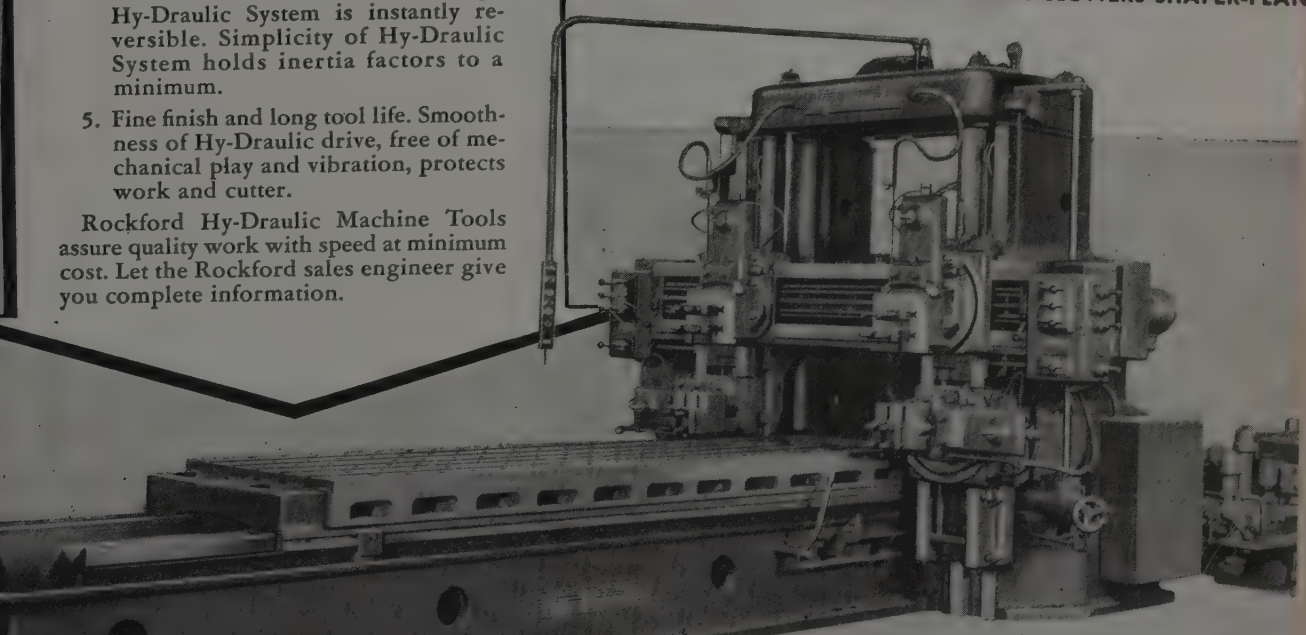

**ROCKFORD HY-DRAULI**
**DOUBLE-HOUSING PLAN**

temperature (where it might act as a toughening "cushion") and at low temperature (where it may transform to untempered, brittle martensite). In the present work no attempt was made to determine directly whether any austenite was retained. Indirect evidence of its presence was secured in certain of the austempering experiments but these have little bearing on ordinary heat treatment of the steels concerned. Indirect evidence of absence of, or lack of effect of any retained austensite in oil-quenched and tempered SAE-2340 was obtained in a study of effect of time at minus 110° F on the notched-bar values at that temperature, and on room temperature, and minus 110° F values after 15 cycles of cooling to and holding at minus 110° F for 20 hours then warming and holding at room temperature 4 hours. No differeneces were observed. However, marked differences were found in austempered SAE-3312, as a result of cooling to minus 110° F.

Bainite structures, obtained by austempering, that is constant temperature transformation, sometimes show good toughness, even at low temperatures, but the necessary adjustment of steel composition and the limited range of sizes in which austempering is effective for toughening, make the production of bainite structures that will prove beneficial for low-temperature behavior, a tricky matter. In general, the appearence of bainite structures during conventional heat treatment is accompanied by inferior low-temperature behavior. Timmons[7] has presented specific evidence to this effect.

This leads to special warning against accepting the data for the specimens of the present work, quenched in 0.42 x 0.42-in. size, as representative of larger sections. In this connection, attention is called to the hardenability curves (Part II of the complete report) which need to be studied in relation to any attempted extrapolation of the present data to larger sections. McCleary[4] remarks, "There is much discussion of the value of impact testing on small test pieces which are through-hardening when the material is to be used in larger sections, which are not through-hardening—in fact pieces should be tested that represent the section to be used."

Fine grain certainly ordinarily accompanies, but may not itself be the direct cause of, energy absorption at low temperatures. Moser[5] concluded that the greater volume of deformed metal, the higher the energy absorption, according to a straight-line relationship. The Naval Research Laboratory[8] modified this idea into that of a straight-line relation between energy absorbed and volume of deformed metal times the hardness increase caused by the cold work. Epstein[3] showed that a series of four steels, placed themselves in the order of decreasing transition temperatures with decreasing hardening on cold work, which, according to the Naval Research Laboratory idea, should mean increasing deformed volume. The least hardenable by cold work of the steels studied by Epstein was a fine-grained, aluminum-treated steel. The others were semikilled, coarse grained.

Hence, the lesser tendency to work-hardening in the fine-grained steel may be as responsible for its behavior as the fine grain itself. However, the improvement is generally ascribed directly to fine grain, or, alternatively, to an "aluminum" effect. This, of course, means actual fine grain existing under the conditions of heat treatment, not the McQuaid-Ehn grain size, for the McQuaid-Ehn test is carried out at 1700° F, at which temperature many steels coarsen that do not coarsen at their proper temperatures of heating for normalizing or quenching, and steels returned fine-grained at 1700° F may be coarsened by heating sufficiently higher. There is some indication that, even though not actually coarsened, a steel heated close to its coarsening temperature may show impaired notched-bar behavior, hence coarsening tendency, as well as grain size, demands evaluation.

Fine-grained ferritic steels usually show very much improved low-temperature notched-bar behavior in comparision with similar, but coarse-grained steels. Annealing, compared to normalizing; the as-rolled condition, compared to the normalized condition; over-heating prior to quenching or normalizing, that is, anything leading to a coarse austenitic grain, is deterimental. Untempered martensite is, of course, brittle at any temperature, while the toughness of structures resulting from the tempering of martensite depends largely on the grain size or degree of agglomeration of carbide in the tempered structure.

Finely emulsified sorbite behaves better at low temperatures than coarser sorbite. Softening a quenched structure so that a weak steel, but one with very high room temperature notched-bar results, is obtained, may lead to very low notched-bar results at much lower temperatures, whereas a stronger, less softened structure may show high results. But a very hard steel always tends to be brittle, so there is some optimum degree of tempering. The response of different steels and different heats to different degrees of sorbitic tempering may be quite different. Different steels show different optima of tempering; maximum toughness, as appraised by other than low-temperature notched-bar tests, is no assurance of high values at low temperature.

The finer the pearlitic structure obtained at the faster cooling rates in normalizing, the better the low-temperature behavior; but if the cooling rate is so far decreased that bainite rather than pearlite is produced, poor low-temperature behavior may result. There are few, if any exceptions to this generalization in as-rolled or normalized steels, but in

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AUGUST, 1946

# COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

*Prepared Each Month by Bridgeport Brass Co.* "Bridgeport" BRASS CO. *Headquarters for BRASS, BRONZE and COPPER*

## Combating Double Corrosion

### *Duplex Tubing Increases Service Life*

With practically all commercial processes engineered on a basis of continuous operation, premature failure from corrosion of tubing used in the construction of various types of heat exchanger equipment, may mean costly shut-downs.

The problem of corrosion is a serious one since most operations involve moisture with varying degrees of concentration of acid or alkali solutions. Corrosion is especially troublesome in oil refining, chemical industries, food and liquor processing and paper manufacture. For most conditions, copper-base alloys are preferred because of their superior corrosion-resistant properties which depend upon the development of protective corrosion films which tend to retard further chemical attack. Some copper-base alloys are better than others. However, all metals have their limitations, and one which stands up well for one type of corrosive element, may be entirely unsuitable when used with another type.

One of the most troublesome corrosion problems occurs when tubing is attacked simultaneously inside and outside by two entirely different types of corrosive media. However, by treating such a condition as a double corrosion problem, it is possible to select one material which can cope with the outside corrosion and another which will stand up against the inside corrosion. By making inner and outer tubes of these materials and drawing them together to make Duplex Tubing, a very satisfactory solution can often be obtained.

#### For Double Corrosion

In ammonia refrigeration systems so widely used in processes involving petroleum refining, manufacture of synthetic rubber and fibers, artificial ice, pharmaceuticals, food preservation, chemicals, etc., where steel pipe rusts away from contact with water and copper does not stand up when in contact with moist ammonia, Duplex Tubing composed of steel for the ammonia side and copper or a copper-base alloy for the water side is very successful.

For oil refining and in the natural gas industry, we have supplied Duplex Tubing with steel outside to resist various corrosive petroleum vapors and copper inside toward the fresh water; steel outside toward the oil and admiralty inside toward the circulating salt water. Other applications in these industries call for combinations such as cupro nickel, red brass, copper or brass, with aluminum either outside or inside.

Duplex Tubing shows promise in connection with mercury vapor systems with steel to the mercury side and a copper-base alloy to the cooling water side.

#### For Mechanical Purposes

Aside from corrosion, Duplex Tubing has possibilities in connection with the catalytic cracking of hydrocarbon gases at elevated temperatures. Copper-base alloys generally do not interfere with the catalyst but at elevated temperatures they lose much of their strength. Laboratory tests indicate that Duplex Tubing consisting of an outside metal such as steel, which retains its strength quite satisfactorily at high temperatures, and copper or a copper-base alloy inside, has good possibilities.

Suggested applications for Duplex Tubing are pump liners—steel on the outside and a brass lining inside and certain types of steel-backed bearings to be manufactured from the proper components.

#### Preventing Taste and Color Contamination

In addition to overcoming severe double corrosion problems, Duplex Tubing can be used to prevent contamination of taste and color. For example, in connection with the handling of beverages, cosmetics, drugs, dyes, food products, formaldehyde, fruit juices, gums, oils, resins, varnishes and raw materials used in the manufacture of plastics, Duplex Tubing with a copper base alloy to the water side and aluminum or stainless steel to the product side, is finding increasing use.

#### Improved Heat Transfer Properties

Bridgeport's method of manufacture insures a good close mechanical bond between the two components of Duplex Tubing. As a result heat transfer properties are not impaired. This is shown by the experimental results given in the Table below. Improved heat transfer properties of Duplex Tubing with copper inside and steel outside over steel alone is very evident. This has been confirmed under actual service conditions where Duplex Tubing has replaced steel.

It is a matter of fact that the products of corrosion of copper-base alloys are thinner and interfere less with heat transfer than the voluminous heat insulating scales which accumulate on most ferrous metals.

#### Duplex Tubes Can Be Expanded and Rolled In

Duplex Tubing can be expanded or rolled into the tube sheet in the same way as ordinary condenser or heat exchanger tubing. Because Duplex Tubing is stiffer than ordinary tubing, obviously slower production should be expected. Duplex Tubing with a harder metal on the outside and a softer one inside may sometimes require special protection from the expanding tool during installation. For this purpose, a snug-fitting copper sleeve about 2″ long and ranging in thickness from 0.010″ to 0.020″ can be supplied. These sleeves may be left in place as they offer very little obstruction, or if desired, they can be readily removed after the expanding operation is completed.

Duplex Tubing generally conforms to standard Condenser Tube sizes and is supplied in straight lengths up to 24 ft., the diameters ranging from 5/8″ o.d. to 2″ o.d. The total wall thickness ranges from 0.049″ to 0.180″. On thinner gauges, the wall thickness of Duplex Tubing is generally divided equally between the two components. On heavier gauges, however, the wall thickness of the copper-base alloy component may be from one-third to one-fifth of the total wall thickness.

*(Continued on page 2, col. 2)*

**RESULTS OF HEAT TRANSFER TESTS ON DUPLEX TUBING**

*Steam Condensed on Outside Surface with Fresh Water Passing Through the Tubes*

| Water Velocity Feet per Second | OVER ALL HEAT TRANSFER RATE AT INDICATED WATER VELOCITY BTU/HR. / SQ. FT. / °F. | |
|---|---|---|
| | Duplex Tubing ¾″ O.D. x Wall Thickness .0325″ + .0325″ | Regular Tubing ¾″ O.D. x Wall Thickness .065″ |
| | Steel to Steel | Steel |
| 2½ | 371 | 380 |
| 3½ | 458 | 458 |
| | Copper to Copper | Copper |
| 2½ | 580 | 600 |
| 3½ | 750 | 740 |
| | Steel to Copper | Steel |
| 2½ | 465 | 380 |
| 3½ | 625 | 458 |

## CAUSES OF CORROSION

*This article is one of a series of discussions by C. L. Bulow, research chemist of the Bridgeport Brass Company.*

### EFFECT OF STRESS ON CORROSION

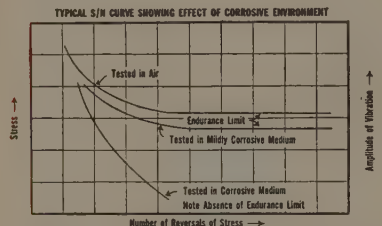
#### Vibrating or Cyclic Stresses Accelerate Cracking (Cont'd)

Fatigue cracking and corrosion-fatigue cracking may be encountered in connection with metal parts or structures which are subjected to numerous cycles of vibration such as are encountered in many of the following applications.

1. Swaying electrical transmission lines
2. Cables and wires used in catenary construction
3. Bellows
4. Leaf springs
5. Coil springs
6. Spring-type electrical contacts
7. Diaphragms
8. Bourdon tubes
9. Axles
10. Gears
11. Shafts
12. Tools
13. Tool holders
14. Machine parts
15. Motor parts
16. Piston rods
17. Heat exchanger tubes, etc.

#### Corrosion-Fatigue Cracking

When alternating stresses are applied in a corrosive environment, the stresses necessary to produce "corrosion fatigue cracking" are much lower than those needed to produce "fatigue cracking" as shown in the following curve.


TYPICAL S/N CURVE SHOWING EFFECT OF CORROSIVE ENVIRONMENT
Tested in Air
Endurance Limit
Tested in Mildly Corrosive Medium
Tested in Corrosive Medium
Note Absence of Endurance Limit
Stress
Amplitude of Vibration
Number of Reversals of Stress

The damage produced by the simultaneous action of alternating stress and a corrosive agent greatly exceeds that produced by the independent action of these two factors. Under these conditions, no endurance limit occurs and the stress which can be supported depends upon the length of exposure to the corrosive environment and the duration of loading. The alternating stresses also increase the rate and depth of corrosion pitting which, in turn, materially shortens the time to produce failure since these pits may function as stress raisers (mentioned in the April, 1946 Copper Alloy Bulletin). B. T. Haigh in 1917 found that the damaging effect of ammonia on brasses was produced only when the ammonia and alternating stresses were simultaneously applied.

In other media, such as fresh and salt water, the endurance limits for brasses and bronzes frequently are only slightly lower than when tested in air.

## Combating Double Corrosion

(*Continued from Page 1*)

#### Wide Range of Application

The following list of industries are among those that use Duplex Tubing.

Beverages
Chemical plants
Coke by-product plants
Cosmetics
Dyes
Drugs
Explosives
Fertilizer plants
Food industries
Nitrogen fixation
Oil refining
Refrigeration
Synthetic fibers and resins
Varnishes, etc.

#### Combinations Available

The following copper-base alloys can be combined with other metals or alloys, either inside or outside, to form Duplex Tubing.

*COPPER-BASE ALLOYS*

Admiralty
Aluminum Brass
Aluminum Bronze
Copper (all grades)
Cupro Nickel (80-20 and 70-30)
Muntz Metal
Naval Brass
Red Brass (85-15)
Yellow Brass (70-30)

*OTHER METALS*

Aluminum
Monel
Nickel
Steel (low carbon)
Stainless steel

It must be borne in mind, however, that Duplex Tubing is designed for special purposes and should not be used indiscriminately. When properly used, it gives very satisfactory and economical performance.

#### When Submitting Inquiries

When submitting inquiries for Duplex Tubing, it is advisable to give as much data as possible regarding the intended application to our Technical Service Dept. This should include the nature of the corrosion problem, outside diameter, wall thickness of both inner and outer tubes and any other pertinent information. We shall be glad to help recommend suitable alloys to meet your operating conditions.

Write for your copy of The Duplex Tubing Technical Bulletin, which contains applications and methods of installing Duplex Tubing.

## NEW DEVELOPMENTS

*This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.*

**New Brinell Testing Machine** is designed for work 24 to 51 in. in height. Motor driven hydraulic test head equipped with reversible elevating motor. Head can be supplied with direct reading attachment or with separate Brinell microscope for hardness reading. **No. 703**

**New All-Angle Vise** has been developed for positioning work on machine table. The base plate mounting carries a vertical pivot for graduated horizontal movement to 90 deg. on either side of center, a horizontal pivot for vertical movement to any angular position between horizontal and vertical, and a final vertical pivot in vise itself for swivel to 90 deg. on each side of center. **No. 704**

**Heat Transfer Determination Unit** recently announced, can observe batch or continuous-process reactions on pilot plant basis. Consists of Pyrex tower, tantalum bayonet heater, tantalum condenser and steam gage, steam-control valve and thermometer fittings: capacity is 1 gal. acid solution per hr. on 100-lb. steam. Can be operated at pressures to 150 pounds. **No. 705**

**Axial Relief Fixture** to sharpen cutter teeth and flutes is now available. Handles cutters with 2, 3, 4, or 6 flutes. Provides required cam-controlled axial movement to grind end clearances on cutter teeth or to operate a grinding wheel along center flutes. **No. 706**

**Large and Small Lapping Roll** of centerless machine, mounted so their tops appear above cabinet assembly, are used for lapping cylindrical work. Rolls are driven by ½-hp. 110-volt ac. motor inside the cabinet. **No. 707**

**New Line of Solderless Terminals** and the required tools has been announced for application on solid wire as well as stranded wire, or a combination of the two. Terminals are made of copper, hot electro-tinned. **No. 708**

**Metal Slitting Machine** takes coil stock to 20 in. in diameter and weighing to 400 lbs. Driven by 5-hp. belt-connected motor. Capacity is 5 cuts for 4 strips in .08-in. nonferrous, or .062-in. mild steel or equivalent number of additional cuts in thinner gages to 12 or 18-in. max. width. **No. 709**

**New Valve** has been developed for application on commercial refrigeration equipment with capacities from ¼ to 1½-ton with Freon 12; ½ to 3-ton with methyl chloride. Limits evaporator pressure by closing when predetermined pressure has been reached during "off" cycle, remains closed after compressor starts until pressure is reduced below valve setting. **No. 710**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ROD—Alloys for screw machine operation. Duronze III high strength, corrosion-resistant, good for machining and hot forging. Hot forging and cold heading alloys. Welding Rods. Copper-covered ground rod.

TUBING—For miscellaneous fabrication. For condensers and heat exchangers. For water, air, oil and hydraulic lines.

DUPLEX TUBING—for conditions too severe for a single metal or alloy.

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WAREHOUSE SERVICE—Warehouse and jobbers stocks available for prompt delivery in principal cities.

TECHNICAL LITERATURE—Manuals and handbooks available for most products.

"Bridgeport" BRASS

BRIDGEPORT BRASS

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quenched and tempered steels, exceptions occur, leading to the conclusion that grain size, per se, is not the only criterion.

The carbon content of a ferritic steel in the as-rolled or normalized condition, markedly affects the notched-bar values at room temperature, shown by the conventional specimen. With a low room-temperature value in the high-carbon steels and a fracture already approaching the brittle type, the low temperature change is relatively small compared to the shift in values above and below the transition temperature range in softer steels. A medium-carbon steel, quenched and tempered only to around 50 rockwell C or more, likewise shows low room-temperature values and still lower ones at subnormal temperatures. However, no steel studied in the present work has failed to show measurable energy absorption even at minus 310° F, even if the fracture is of the brittle type.

Some fine-grained fully hardenable steels, quenched and tempered, to troosto-sorbite or fine sorbite, return values of energy absorption of 15 to 20 ft-lb, round-notch, and tough type fractures at minus 310° F, together with high static strength.

Steels and treatments returning high values at minus 175° F, are somewhat more plentiful, and a good many give high values at minus 110° F, but actual test for each heat of steel and each treatment is required. There is a considerable degree of individuality among various lots at this temperature range.

When quenching and tempering cannot be applied, very low-carbon, fine-grained steels with generous amounts of ferrite-strengtheners, such as nickel, are usually advocated for use at very low temperatures, the low static strength being accepted in order to obtain high notched-bar toughness. The one steel of this type included in the present study C 0.06, Mn 0.04, P 0.002, S 0.011, Si 0.005, Ni 1.34, Cr 0.03, Mo 0.04, Cu 0.75, Al 0.020, $Al_2O_3$ 0.024 was coarse-grained and gave inferior low-temperature behavior, but other extensive data [6, 8] are available.

While the nonquenched steels are sensitive to carbon content, in the quenched and tempered steels of medium carbon content, the carbon level is not so critical. Lower carbon, high-alloy steels, and higher carbon low-alloy steels, if of equal grain size and hardenability, behave much alike. Nevertheless, even in such steels, those of higher carbon content show a general tendency toward less "tough" behavior.

The National Emergency (N E) steels, as a class, are as likely to give good low-temperature toughness as are the SAE steels as a class. Both groups are similarly influenced by the factors mentioned above. Both require grain-size control for optimum results, and "individuality" of particular heats, presumably related to the finishing practice employed in melting, may occur in either group. Slack-quenching is deleterious in either group but since the N E steels are classified in relation to SAE steels primarily on the basis of hardenability, there is strong probability that when an equally fine-grained, equally hardenable N E steel is used instead of a SAE steel, its low-temperature behavior will be indistinguishable.

Guns and armor sometimes have to operate at minus 50° F; aircraft may operate at temperatures approaching minus 100° F, and in equipment for low-temperature processing of petroleum products, synthetic rubber, etc., temperatures of minus 300° F or below may be required. This raises questions regarding behavior of metal at low temperatures.

As far as these questions can be answered by conventional tests, the answers, in respect to those static properties revealed by tension, compression, and torsion tests, show no cause for alarm, since the metals and alloys all get harder and stronger as the temperature drops, and while this increase in strength naturally is accompanied by a decrease in ductility and workability, the decrease is less than is normally produced in room temperature ductility by variations of composition or heat-treatment leading to a comparable higher level of room-temperature strength.

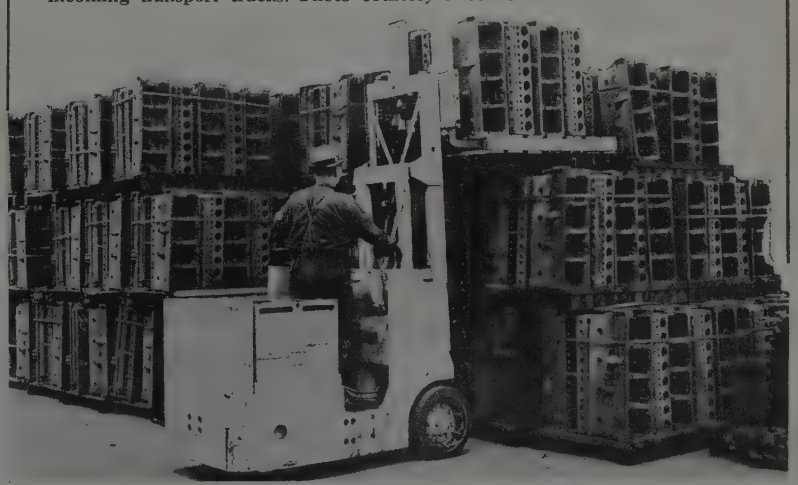
Broadly speaking, static tests indicate metals to be better materials of construction at low than at normal temperatures. For static service in the region around minus 300° F, the increased hardness and lower ductility might incline the engineer to a slightly different selection of composition and treatment than he would choose for room-temperature service, but the change in these properties would hardly be a factor in the choice for minus 100° F service.

Endurance tests on smoothly polished specimens indicate the endurance limit to be increased at low temperatures. Data for endurance tests on notched specimens are relatively scanty, especially below 40° F, but no cases of markedly increased notch sesitivity in fatigue at low temperature seem to have been reported; what tests have been made on steel, aluminum alloys, and magnesium alloys have given reassuring results. Moreover, definite cases are on record showing lack of notch sensitivity in fatigue, in spite of notch sensitivity as revealed by single-blow tests. An example is shown in Fig. 3.

Inglis[9] cited a nickel-chromium steel whose original room temperature notch-bar value was 38 ft-lb. After several years' use at 750° F, this value fell to 4 ft-lb. Endurance tests on threaded specimens of the original and the embrittled material gave identical values.

Fatigue failure is primarily predicted upon starting of a crack, a notch of almost infinite sharpness. Once a crack is formed, if the stress under which it formed is repeated, failure ensues very rapidly almost as rapidly in the "toughest" steels as in very "brittle" steels. If the crack is formed at a stress well above the regular service stress failure may be long delayed and fracture may progress step by step corresponding to the successive applications of higher-than-service stresses, to produce the familiar "oyster-shell" markings of the typical fatigue failure. Finally the cross-section is so decreased that one final application of load causes instantaneous fracture of the remaining section. Only at that point does single-blow

**STORING ENGINE BLOCKS: Palletized engine blocks in unit loads weighing between 3000 and 5000 lb are tiered three-high by battery-powered industrial trucks in this storage yard of a leading automotive manufacturer. Blocks unit loaded and strapped to pallets are delivered by incoming transport trucks. Photo courtesy Electric Industrial Truck Assoc.**



notched-bar behavior come into play. The crack is so extremely sharp that triaxial stressing is extreme and materials counted tough by the conventional notch-bar test may break through the final cross-section with a "brittle fracture," often, through erroneously, thought to represent "crystallization" of the metal in fatigue. The metal has not crystallized; the type of fracture comes from the restraint upon deformation exerted by the extremely sharp notch, and is very little affected by the nature of the steel.

Because the formation of the sharp crack is the vital feature in fatigue and the level of the repeated stresses controls its progress, the fatigue phenomena are quite at variance with those concerned in fracturing a conventional notched bar with a single blow.

Some engineering metals and alloys show notch brittleness at low temperatures in the single-blow notched-bar test, usually called the "impact test", although in tension-impact tests on unnotched bars, the behavior may be as ductile as it is in the static tension test. Thus attention becomes centered on the notch rather than the impact, though the question of behavior at very high impact velocity, important in projectiles and armor, has not yet been effectively explored.

That it is the notch, rather than the impact, that leads to brittle behavior in ordinary engineering service where impact velocities are not of the order met with projectiles and armor, is evidenced by the behavior of malleable iron, discussed in a recent report[9].

One standard malleable iron, with 8 ft-lb Charpy at room temperature, 4 at minus 50° F, withstood at minus 60° F 22 blows at a 21 lb tup falling 3 1/3 ft upon the unnotched wedge used to evaluate toughness of malleable iron. Very interesting photographs of fractures in malleable iron, showing large deformation when no notch is present and decreasing amount of deformation as the width of the bar is increased or the notch made sharper, are given in that report.

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*Material for this article is based on the contents of summary of Part I: Behavior of Ferritic Steels at Low Temperatures, and was made available through the courtesy of American Society for Testing Materials, 1916 Race Street, Philadelphia.*

# WELDING LOCOMOTIVE BOILERS

## *first time in railroad history*

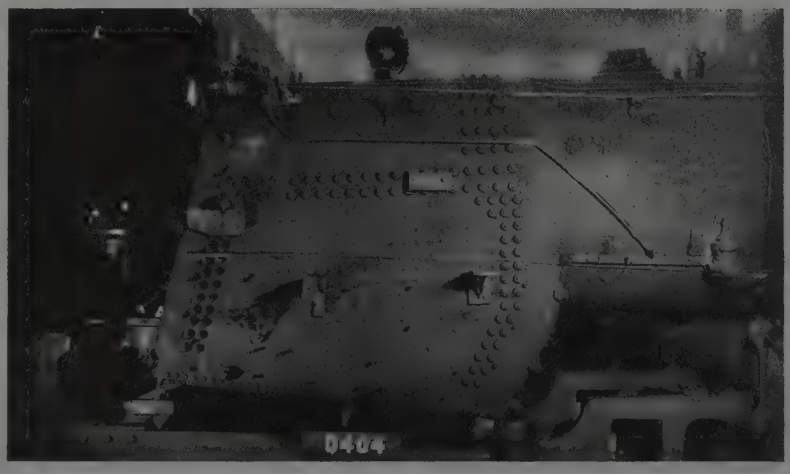
WELDED locomotive boilers are now being built for the first time in United States railroad equipment history at its shops in Schenectady, N. Y., according to American Locomotive Co. Development is said to climax 9 years of experimental operation of a welded boiler built by the company in 1937 for a freight locomotive of the Delaware and Hudson railroad.

Before the first boiler was installed for road service in 1937, according to R. B. McColl, Alco president, it was set up as a stationary boiler and operated for 6 weeks. Later it was mounted on a locomotive and examined every 3 months for the first year. All welded seams were examined carefully, and during the second year the same procedure was followed every 6 months. Thereafter the boiler was examined once a year and, during 9 years of operation, all welded seams were found to be in perfect condition and free of leaks.

Advantages of the welded construction include greatly reduced boiler maintenance and costs in railroad shops and reduced time locomotives are out of service due to boiler repairs. The smooth contour of the welded boiler permits easier application of boiler lagging and jacket, and provides an equally smooth surface on the interior—a factor contributing to more satisfactory washouts by maintenance crews.

Saving of weight in the welded design was pointed out as another factor. Depending on the type and size of the locomotive, the weight saving may range from 3000 to 6000 lb for the locomotive boiler alone.

One important advance which contributes greatly to the construction of welded boilers is the use of x-ray apparatus in detecting flaws in metal. After passing x-ray examination, in the company's shops, each boiler is stress relieved in a huge furnace large enough to take the boiler as a unit. New manufacturing facilities now permit the company to build any size welded locomotive boiler as well as locomotives complete with welded boiler equipment.



*View of welded locomotive shown in shops of American Locomotive Co.*

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## Metal Cleaners

(*Concluded from Page 74*)

light are referred to as Luminograms.

A series of Luminograms is shown in Fig. 2. This particular series deals with the cleaning ability of a single alkali, sodium metasilicate, ranging in concentration from 2 to 10 per cent. It can be seen in the Luminogram that as the concentration of cleaning compound is increased there is a progressive reduction in the amount of residual oil on the metal surface.

It should be noted that the test not only indicates the amount of oil resident on the metal surface, but also illustrates the distribution of the oil. If a metal surface carries only a small amount of oil by weight, but the oil is concentrated in a relatively small area, a good deal of damage can be done to any superficial coating.

**Spray Pattern Method:** Recently a method for evaluating metal cleaners was described[3] which was developed as a result of work carried out at Frankford Arsenal, Philadelphia. This method, reported to be fairly simple and capable of giving results of good reproducibility, involves coating of metal panels with various oils by specific dipping and drainage technique, followed by a carefully controlled cleaning and rinsing procedure. The panels are covered with a fine spray of water, which condenses as droplets on the oil-covered areas, providing a pattern that remains constant long enough to enable a sketch to be drawn on paper divided into 100 squares. In this work reported from the arsenal, the average value for cleaned area of 5 panels was designated as the cleaning efficiency index for a particular cleaner. Some of the modifications desirable for application of the method developed at Frankford to specific plant problems are obvious. The plant operator will probably want to adapt the procedure to study removal of specific oil contaminants on the particular product with which he is working.

In the experimental procedure for the spray pattern method, the test panels used, according to the arsenal procedure, consisted of light-gage metal, 4 in. square, of cold-rolled SAE 1010 steel. Cold-rolled brass or aluminum may also be used. In their preparation two holes are drilled in each panel to enable the insertion of a 2-pronged panel holder (Fig. 5) which maintains the panel in position without the use of nuts and bolts or similar arrangements. This was found necessary because other holders trapped some of the oil which afterward spread and gave erroneous values. The steel panels are degreased before use with an alkaline silicate plus a synthetic detergent and rinsed with water. Following this they are pickled at room temperature, for 1 min, in 6N hydrochloric acid containing a small amount of wetting agent, rinsed in running cold water for a short time, given two successive rinses in hot alcohol containing 1 per cent ammonia (70 to 80° C), air-dried, and stored in an evacuated desiccator until used.

**Coating of Panels:** The panel is immersed in the oil to about half its height. The container is tilted so that the entire panel is covered with oil and then returned to an upright position such that the excess oil drains from around the holes in the panel. The panel holder prongs are inserted and the panel is hung in a rack at a 45° angle as shown in Fig. 5. The panels are allowed to drain at 25° ± 2° C for 1 hour.

Two oils are used for coating panels. In one case, the coating is obtained from a hydraulic mineral oil of high viscosity index, with a viscosity at 100° F of 470 sec Saybolt universal viscosity. In the other case, the coating is obtained from a solution of sulphurized lard oil, containing approximately 12 per cent sulphur, dissolved in toluene to the extent of one part of sulphurized oil to 9 parts of toluene. In the work performed with this procedure, the average weight of oil on each panel after coating with mineral oil was 0.283 gram and after coating with sulphurized fatty oil was 0.038 gram. Maximum variations were ± 4 per cent for the mineral oil and ± 6 per cent for the sulphurized fatty oil, with the great majority of the weights varying from the average by no more than 2 per cent.

**Cleaning Solution:** The cleaning materials are dissolved in water in the proper concentration to make 2 liters of solution. The beaker containing the solution is placed in a constant-temperature bath and the temperature is maintained at 60° ± 1° C.

**Cleaning and Rinsing Operations:** The panel holder is inserted through a cover which tends to reduce evaporation and is connected to a small motor as is shown in Fig. 3. The panel is placed in the cleaner so that at least 1 in. of the solution is above the top of the panel, to reduce the effect of temperature changes near the surface. The motor is operated at 10 rpm and the cleaning process is carried on for 5 min. The panel is then withdrawn and placed in a tank of running water maintained at 50°C. It is withdrawn from the water once each minute during a rinsing period of 5 min. The panel is then rinsed in water at room temperature for 1 min and allowed to drain for 1 min.

**Quantitative Evaluation:** To evaluate the results quantitatively a fine spray of water is directed at the panel from a distance of approximately 2 ft by means of an atomizer connected to a compressed air line. The head of a De Vilbis bulb atomizer was attached to a compressed air line equipped with a reducing valve. A small spray gun, such as is used for spraying paint, may also be used. The air is filtered through glass wool. The oil covered regions are delineated by the condensation upon them of fine droplets of water, resulting in a pattern which remains constant for at least 20 min, Fig. 7. These are then sketched on paper ruled into 100 squares as shown in Fig. 6. The number of squares covered with water (no droplets condensed) is counted for each side of the panel. The results obtained with 5 panels, resulting in 10 observations, are averaged and this is called the cleaning efficiency index.

The first step in using any method for evaluation of metal cleaners is to make certain the type and grade of oil that is to be used in determining the oil removing properties of the cleaner is as hard to remove as any that will be encountered in production. It is believed that these methods of scientific cleaner evaluation will go a long way in eliminating the necessity of using production lines to find the right cleaner.

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## Microfilming Described In Eastman Booklet

Fundamentals and application of microfilming are explained in new booklet entitled "50 Billion Records Can't Be Wrong," published by Recordak Corp., subsidiary of Eastman Kodak Co., Rochester, N. Y.

Business documents, such as letters, reference cards and reports up to 14 in. wide and unlimited in length are photographed on 16 mm film. As many as 3000 letters can be recorded on 100-ft roll of 16 mm film; 35 mm film is used for bound volumes, large drawings, charts and diagrams. Companion film readers, including desk and floor models and a portable projector for field use, are available in both sizes.

—o—

Ampocoloy nickel silver, a series of stainless white alloys with 20 to 30 per cent nickel, is the subject of a new bulletin issued by Ampco Metal Inc., Milwaukee. Alloyed primarily for use of food products manufacturers, this series is made in four alloys. Bulletin describes facilities of Ampco for casting and finish machining of this acid and corrosion resistant alloy.

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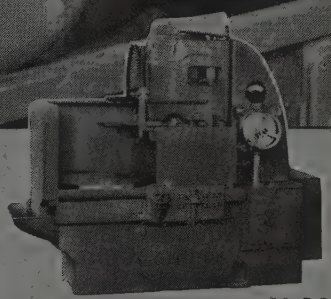

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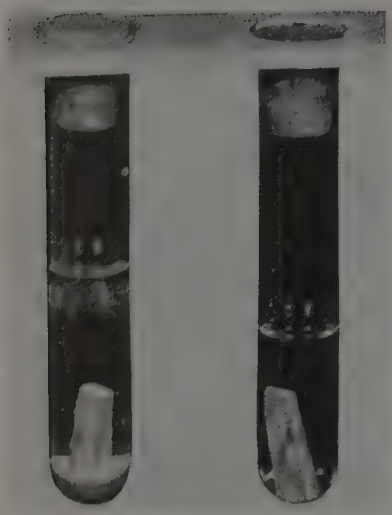


*Fig. 1 (left)—Test tube containing samples of iron coated with lead*
*Fig. 2 (right)—Test tube containing sample of iron coated with zinc*

# Hot-Dip Galvanizing Practice

By WILLIAM H. SPOWERS JR.
*President*
Spowers Research Laboratories Inc.
New York

### History

LUIGI GALVANI, Italian physiologist, after whom galvanism received its name, was born in Bologna, Italy, Sept. 9, 1737. He was appointed public lecturer in anatomy at Bologna in 1762 and gained repute as a comparative anatomist from his researches on the organs of hearing and genito-urinary tract of birds. He enunciated his theory of animal electricity in a treatise published in 1791.

Twenty years before, he had begun his investigations as to the actions of electricity upon the muscles of frogs. The observations that the suspension of frogs on an iron railing by copper hooks caused twitching in the muscles of their legs led to the invention of the metallic arc. The first experiment with this is described in the third part of the *Commentary* under the date of Sept. 20, 1786.

The arc he constructed of two different metals, which, when placed in contact the one with the frog's nerve and the other with a muscle, caused contraction of the latter.

In Galvani's view the motions of the muscle were a result of the union, by means of the metallic arc, of its exterior or negative electrical charge with positive electricity which proceeded along the nerve from its inner substance.

Volta, on the other hand, attributed them solely to the effect of the electricity having its source in the junction of the two dissimilar metals of the arc, and regarded nerve and muscle as conductors.

A Quarti edition of Galvani's works, *opere edite ed inedite del professore, Luigi Galvani*, was published in Bologna in 1841-42 by the Academy of Science of the institute of that city.[1]

Why the term galvanize was chosen is difficult to understand, as no particular galvanic action takes place in the process other than that which is common to all forms of chemical reaction. There is, however, a galvanic or electrolytic action brought into operation when the coated iron is exposed to the atmosphere, on account of the zinc being electropositive to iron, this action resulting in the protection of the metal.

However, so important is this electrogalvanic action as a basic principle in the result which is accomplished by the coupling of iron and zinc, that the name "galvanize" has stuck to the process since its inception. As a general rule the term "galvanize" is taken as referring to the hot-dip process. Other processes utilizing zinc as a protective are usually distinguished by an added description.

### Principles of Zinc Coating Metal

Perhaps the clearest description of the basic principles of galvanizing is given by Lang[2] as follows:

"One of the most persistent problems which confronts the worker in iron and steel is the prevention of corrosion. We cannot rid ourselves of the agents which effect the corrosion of iron without at the same time ridding ourselves of the agents which are essential to life itself.

"Air is indispensable both to human respiration and for the formation of rust and other oxides, for which it supplies the oxygen; moisture is necessary for the

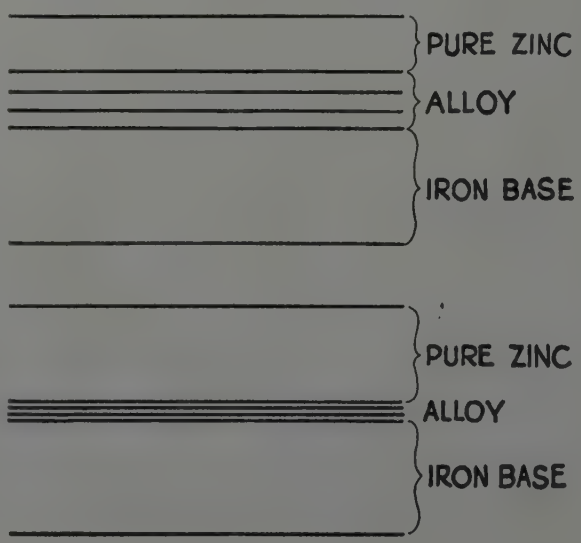



*Fig. 3 (top)—Diagrammatic sketch showing zinc coating applied in thick layers*

*Fig. 4 (bottom)—Sketch depicting zinc coating applied in thin layers*

formation of clouds, which make the earth fertile, and it also supplies the medium in which rusting takes place and hydrates the oxide; carbonic dioxide is an animal by-product and a raw material for the vegetable world, and the exchange of carbonic dioxide and oxygen which is continually taking place between the animal and vegetable kingdom is of vital importance. Then, on the other hand, rust is not readily formed, if at all, unless there be an acid present, and the acid which is most universally distributed is carbonic acid, or hydrated carbonic dioxide.

"There is, as you see, a close relationship between the processes of living and rusting, but, while human beings make up for the rusting or decaying of their tissues by nutrition, it has not yet been discovered how to feed or regenerate iron, and until such a discovery is made we are compelled to take our cue from the ancient Egyptians and resort to embalming.

"There are two general ways of embalming iron as to prevent its decomposition, which might be called, respectively, the metallic and nonmetallic methods. In the nonmetallic method the articles are coated with an organic substance, usually oil, or varnish, the efficiency of which depends on its being more or less air tight; when coloring matter is added to the oil it becomes a paint, but I understand from authorities on the subject that a varnish free from pigments is preferable to anything else.

"The metallic method consists of coating the iron with some other metal, and it is this method which is now under discussion. Iron rusts less easily than does steel; this is perhaps due to the steel being a very composite material. In the iron, which forms the bulk of its composition, is dissolved or immersed a great variety of other substances; some of these are simple such as graphite, silicon and manganese, and others are compound, such as carbides, sulphides, phosphides and silicides. The carbon compounds are very numerous and diversified, being due to the heat treatments; the best known are cementite, pearlite and martensite. Just as variety is to some people the spice of living, so is heterogeneous composition the spice of rusting, in the present instance at any rate."

It is difficult for many persons to understand why zinc is the best rust preventative for iron and steel; they believe it is on account of its cheapness that it is so extensively used. They have an idea that lead would answer far better, and, as it is more noncorrosive than zinc, would protect the iron better. But the softness and difficulty of application react against the use of lead.

The fact that zinc is a corrosive metal does not affect its properties when applied as a coating to iron or steel. If it did not corrode it would not be of value for such a purpose. When iron or steel which has been coated with zinc is exposed to the atmosphere, a galvanic action is set up, although extremely slight. Any two dissimilar metals form a galvanic couple, but as zinc is the most electropositive metal, the galvanic action between the zinc and the iron is as great as could be obtained when iron is used for one of the metals composing the couple.

The result is, therefore, that with the slight galvanic action set up on galvanized iron or steel when exposed to the atmosphere, a corrosion takes place. If it did not follow, then there would be no protection. In this case the electropositive metal, *zinc,* suffers corrosion while protecting the electronegative metal, *iron.* The effect is that corrosion goes on with the zinc exclusively; the iron is not corroded provided any zinc is left on its surface.

The reason for the protection of iron or steel by a zinc coating is on account of the fact that the zinc corrodes slightly, while protecting the iron or steel by the galvanic action set up. Zinc, however, when exposed to the air, does not corrode rapidly or deeply but rather lightly. This property is of great value inasmuch as the zinc coating does not corrode rapidly, even with the galvanic action set up, and it lasts for a far greater length of time than naturally would be expected. The fact, however, that the zinc corrodes and the iron does not, is all that is necessary to protect the iron or steel, even though the corrosion be extremely slight.

Other metals like lead or tin, on account of their not being electropositive to iron do not act like zinc. They act simply as a covering like a paint or varnish, and if portions of the iron happen to be exposed, even such as a pin hole, the iron begins to corrode. With a zinc coating, however, this will not take place.

Figs. 1 and 2 illustrate this point. The two test tubes are shown half filled with water. In each is a piece of iron approximately $\frac{1}{8}$-in. thick, 2 in. long and $\frac{3}{4}$-in. wide. To the piece of iron shown in Fig. 1 has been attached two pieces of lead of approximately the same dimensions. To the piece of iron shown in Fig. 2 has been attached two pieces of zinc of approximately the same dimensions. In both instances the edges of the iron have been left completely bare.

These two samples have been in this water in these sealed tubes for slightly over 21 years.

Recalling what has been said anent to the protective properties of the electropositive metal zinc and the inability of the electronegative metal lead to offer protection as a coating on iron, note the iron sediment at the bottom of the test tube, Fig. 1, (the lead coating) and the heavy loss of iron in the sample. Notice the relatively slight deposit of zinc at the bottom of the test tube, Fig. 2, (the zinc coating) and that the iron sample in this tube is in approximately its original condition.

That galvanized coatings made by the hot-dip method are of higher density than those made by other processes, such as spraying and electrical precipitation, is an accepted fact. Coatings effected by the latter methods may be likened to a fall of snow on a plate of steel and the picture resulting is one of high porosity whereas the hot-dip coating is effected by the alloying of pure zinc with the base metal. This may be referred to as a perfect welding of the two metals.

Some years ago the point was well taken that the spraying or electrical precipitation methods revealed an absence of any alloy structure between the base metal and the pure zinc coat; with the elimination of these alloy layers came a greater ability to bend without peeling. But during the last few years progress in the art of galvanizing has rendered this claim ineffective. Such developments as neutral fluxing and deep, high-fired kettles with their perfect dross flow control, have offered perfect control of the zinc-iron alloy layers in hot galvanizing. These developments will be described in detail later.

Elimination of this claim of advantage brings up the question of porosity of these various coatings. Microscopic examination of the two coatings in Figs. 1 and 2 reveals pinholes in some degree in

**Eight years ago, the Penton Publishing Co. published a book on "Hot Dip Galvanizing Practice" which won wide acceptance as an authoritative source of information on the subject.**

**The original text now has been completely re-edited, abridged and more amply illustrated to cover the latest developments in hot-dip galvanizing. It will be presented to the readers of STEEL in 14 installments of which this is the first. Upon completion of the series the entire 14 articles will be published in book form.**

**The author, William H. Spowers Jr., is president of Spowers Research Laboratories Inc., New York; Mechanical and Chemical Engineer licensed for the state of New Jersey by the State Board of Professional Engineers and Land Surveyors; Associate Editor, "Wire and Wire Products"; and Commander, U.S.N.R., attached to Research and Standards Branch, Bureau of Ships, Navy Department, Washington.**

**—The Editors**

both, but the galvanic action set up by the coupling of the electropositive metal zinc and the electronegative metal iron is so great as to effect a perfect protection of the iron base even though there are pin holes in the coat. On the other hand, the combination of the electronegative metal lead and the electronegative metal iron affords no protection whatever and the iron slowly but surely seeps out from between the lead slabs covering the flat sides of the sample.

Following this matter one step further, it will be recognized that the higher the porosity of the coat of zinc, the more rapid the breakdown of the zinc. This becomes more intensified, the higher the porosity because of the galvanic energy required of the zinc coat. Therefore, the zinc coating of higher density will withstand atmospheric corrosion the longest length of time.

Because of the fact that hot galvanizing effects a perfect bonding of the fluid zinc to the base metal there exists between the pure zinc coat and the base metal three alloy layers. The layer next to the base metal is high in iron and low in zinc, the second or center layer is lower in iron and higher in zinc, while the layer farthest from the base metal is low in iron and high in zinc. These three zinc-iron alloy layers occur in every hot zinc coating, no matter how short the time of immersion. They are the natural result of the bonding of the two metals at the time of the immersion of the iron base in the molten zinc.

These two metals have a high affinity for each other and when iron is immersed in hot fluid zinc a certain amount of the iron bonds with the zinc forming this alloy structure. To a great degree this reaction is the answer to the question, "Why does zinc stick to iron in galvanizing?"

These three alloy layers have been the subject of a great deal of investigation of late years. It has been a well recognized fact that upon the proper control of the width and structure of these layers depends, to a large extent, the ability of the coating as a whole to withstand bending without fracture. In the first place, any alloy of zinc and iron is to some extent brittle and therefore, the greater the width of these layers, the more brittle will be the entire coat. Also the more irregular or "tree-like" is their formation, the less ductile is the entire coat.

The problem then, for those who were investigating the matter, was how to reduce the width of these layers and to successfully obtain an even line of demarcation one between the other.

### Pickling Technique Reviewed

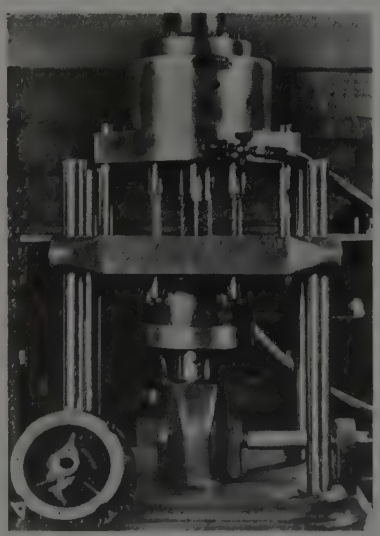
Satisfactory results were achieved in the following manner: In the first place it was known that where active flux washes were used, the iron entered the fluid zinc covered with a layer of iron salts. These iron salts were highly soluble in the zinc bath. They caused the formation of large quantities of dross and actually resulted in great width in the alloy layers. The whole pickling technique was reviewed and it was found that the old process of sulphuric or muriatic pickling, muriatic flux wash, and sal-ammoniac bath flux had the following result: First, the work was brought out of the pickling acid covered with a layer of iron salts; second, the work was immersed in muriatic acid flux wash of even greater attacking ability and left the muriatic with a heavy layer of iron salts; and third, the sal ammoniac only made matters worse. The work finally entered the galvanizing bath coated with a thick, heavy layer of iron salts with the result that a large quantity of dross was formed in the galvanizing kettle and heavy, irregular zinc-iron alloy layers.

Three steps were required to solve the problem. First, a clear running water wash of approximately the same temperature as the pickle was installed between the pickle bath and the flux wash. This entirely segregated the pickling operation and effected a nicety of pickling control such as to avoid overpickling and resulted in achieving an even line of demarcation between the alloy layers and an elimination of all "tree-like" formations. Second, the water wash removed the iron salts left on the work after the attack of the pickling solution. Third, and most important, the active muriatic flux was eliminated in favor of a neutral flux called No. 20 which while perfectly fluxing the work had no attacking ability, effected no further pickling and presented the work to the zinc bath clear, clean and free from any excess iron of any kind. Not only this but the neutral flux was of such a consistency, that by control of its Baume value sufficient was carried over to the top of the zinc to consistently maintain any required depth of volatile bath cover.

By these steps the two main objectives namely, the avoidance of irregularity of alloy structure and reduction of alloy layer width, were largely achieved. However, the investigations did not stop there. It was known fundamentally that work should be galvanized in pure zinc. Many galvanizers were heating their kettles in such a manner as to cause a dross flow in the metal. It was known that dross has a natural inclination to settle to the bottom of the kettle and if nothing interfered it would eventually do so. Investigation disclosed that most installations were being heated from the bottom or too low on the sides, or were forcing the heat through too restricted an area in the sidewalls of the kettle. Any of these errors in practice would cause a zinc flow resulting in an upward thrust in the dross, thereby holding large quantities of this residuum in suspension in that portion of the kettle which should be dross free if the alloy layers were to be reduced.

Immediate attention was given this situation resulting in redesigned installations of larger capacity and deeper, to increase sidewall surface so as to admit of a nicety of control over the heat input. Two-thirds of the heat required for the operation was applied to the top half of the kettle, one-third to the

(*Please turn to Page* 130)



**MULTIPLE DRILLING:** Ten holes are drilled at one time on this standard multiple-spindle drilling head designed by Zager Tool Inc., Cleveland. Speed is regulated up to 300 rpm and hydraulic feed on ram makes it possible to feed up to 20 ft per min. Heat from many spindle bearings is dissipated through a specially provided water jacket in base of the head

# EVERY KIDDE PORTABLE NOW HAS *Trigger-Finger Control!*

## —and every one has these outstanding advantages

1. Fast in action.
2. Simple to use . . . just aim at the fire, pull the trigger.
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4. Harmless to materials and equipment. Cannot contaminate liquids, or corrode metals. Leaves no after-fire mess behind.

Trigger-controlled Kidde Portable Extinguishers have carbon dioxide capacities from 2½ to 20 pounds. Get the facts today!

**Walter Kidde & Company, Inc.,** 354 **Main Street, Belleville 9, New Jersey**

*The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.*

**Kidde**

# Industrial Equipment

## Multipurpose Grinder

Difficult internal or external taper grinds or turns are made accurately on new model ACX multipurpose grinder developed by Lempco Products Inc., Bedford, O. Feature of machine is wheelhead which is mounted on two different compounds, each graduated to 180 degrees.

By moving workhead 6 in. toward or away from work, the swing can be increased from 18 to 30 in. This greatly increases number of jobs which this machine can handle. It has both hand and power cross-feeds, a work length capacity up to 8 in. and two reversible spindle speeds of 80 and 130 rpm.

Chucks are quickly and easily mounted on face plate by a draw bar which extends through the spindle. Wheelhead has a 2-hp motor with ball bearing spindle, and speeds of 6000 and 12,000 rpm.

A retractible tool-holder bar enables finished grinding to follow turning operations without removing the cutter. An automatic sizing device insures exact duplication of successive pieces on production runs.

*Steel* 8/12/46; *Item No.* 9125

## Quintuplex Pump

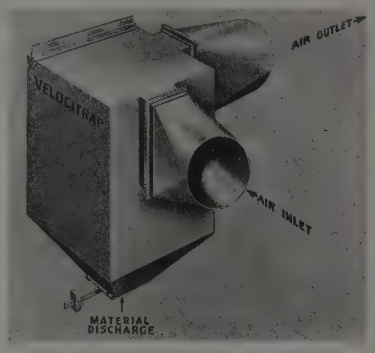
Rated at 300 to 450 hp, depending upon its speed, a 6 in. stroke inverted quintuplex pump is announced by Aldrich Pump Co., Allentown, Pa. Plunger diameters range from 2 to 5¼ in., working pressures from 700 to 5000 psi and capacities from 60 to 850 gpm.

Quintuplex pumps offered by Aldrich include 6, 8, and 10 in. pumps requiring from 300 to 1000 hp.

*Steel* 8/12/46; *Item No.* 9393

## Dust Trap

Contaminated air removed by a dust control system can be relieved of materials with a recovery value with the Velocitrap, manufactured by Claude B.




Schneible Co., 2827 25th street, Detroit 16. By salvaging material in a dry state, it reduces abrasive wear in duct system and collectors and eliminates settling of material in ducts.

Placed in intake duct ahead of collector, it expels solid particles by centrifugal force through slot-shaped opening in an elbow of duct within unit. Material removed is deposited in hopper and air is readmitted into duct through another slot to prevent back pressure.

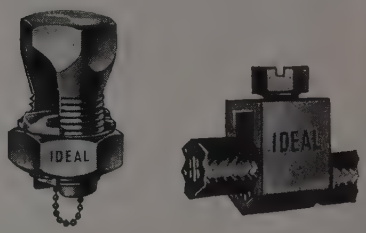
Velocitrap is made in four types for various operating conditions and in a range of capacities from 2000 to 20,000 cfm. It is adaptable to any wet or dry dust collection system.

*Steel* 8/12/46; *Item No.* 9457

## Solderless Connector

Ideal Industries, Inc., 5076 Park avenue, Sycamore, Ill., is announcing a new line of split bolt and service entrance connectors for making permanent or temporary solderless connections.

Split bolt type is made in one and two-piece types with small and large heads. Materials include bronze, brass and aluminum. Uniform contact surfaces assure maximum conductivity and low resistance. Wide range of sizes accomo-




dates all solid and standard wire from No. 6 to 1,000,000 circular mills.

Service entrance connectors are made of cold drawn copper with screws made of Everdur. Five sizes for No. 12 solid or No. 10 stranded to No. 2 stranded wires are offered.

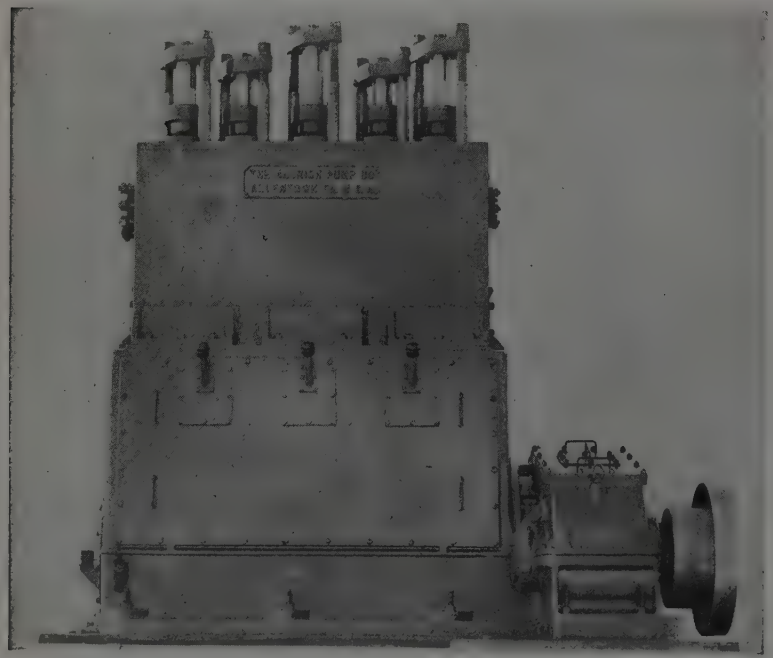
*Steel* 8/12/46; *Item No.* 9389

## Truck Battery Charger

An automatic motor generator set for direct current charging of motorized lift truck batteries of either lead-acid or nickel-iron types is latest product of Motor Generator Corp., division of Hobart Bros. Co., Troy, O. Generator is a 15-16 v, dc, 50 amp, ¾-kw diverter pole type, rated and built as an integral unit with a 3-phase, ac, 220/440 v, 60 cycle, 1½-hp squirrel cage induction, ball bearing motor.

An ammeter to indicate the rate of charge, slide fixed resistance coil, a magnetic motor starting switch, automatic reverse current cutout and interval timer are housed in control cabinet.

Setting of interval timer starts ma-



*(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 114.)*

ECONOMY THRU EFFICIENCY

# HANSEN COUPLINGS SAVE

## TIME • MATERIAL • MONEY

You see more Hansen couplings in daily operation in plants all over the country, because when the pressure was on for peak production during the war Hansen couplings outperformed all others and were a contributing factor in not only peak production but economical and efficient production.

Today, economical and efficient production head the list of "musts" in any industry. Make no mistake about this...no coupling on the market has the all 'round advantages of Hansen couplings.

Hansen Push-Tite couplings are simple and easy to operate, slight push of plug into socket it is connected and air is automatically turned on, easy pull on sleeve with thumb it is disconnected and air is automatically shut off. No twisting or turning to lock, connect or disconnect, no kinking of hose due to swivel action.

Hansen Push-Tite couplings will handle pressures from ounces to well over 10,000 pounds without leaking.

There's a Hansen coupling for air, oil, grease, oxygen, gasoline and acetylene and they come in a wide range of sizes.

Every day new uses are found for Hansen couplings, perhaps you have a problem that can be licked by the adaptation of one of our couplings, their versatility and uses are unlimited. • *Send in for free industrial catalog.*

## THE HANSEN MFG. CO.

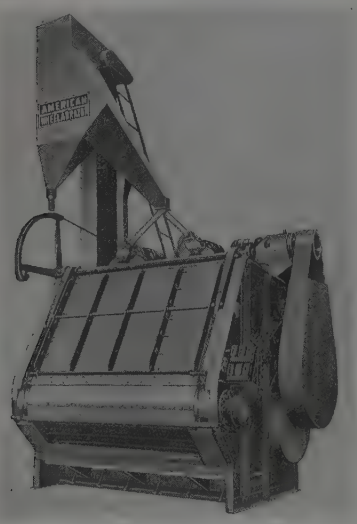
**1786 EAST 27th STREET • CLEVELAND 14, OHIO**

chine automatically and shuts it down at end of preset charging time. Charging rate is controlled automatically by modified constant voltage generator.

*Steel* 8/12/46; *Item No.* 9497

## Abrasive Cleaning Machine

American Foundry Equipment Co., 555 South Byrkit street, Mishawaka, Ind., is marketing a 60 x 96 in. Wheelabrator Tumblast machine capable of cleaning



6000 lb of steel castings in 15 min. It has an operating load capacity of 63 cu ft, and utilizes a method of airless abrasive blasting for cleaning.

Abrasive from an overhead storage hopper of the unit is fed by gravity through a chute and control cage to center of Wheelabrator wheel which rotates at high speed. Products are cleaned or finished by abrasive which is thrown from wheel by centrifugal force. Change in direction of abrasive blast is attained by turning control cage which changes position of opening. Finishes may be varied by selection of size and type of abrasive.

Machine is loaded by bucket raised by electric hoist, dumping pieces directly into machine. Unloading is accomplished by opening dust-tight door and reversing the endless apron conveyor on which the pieces tumble. Spent abrasive drops through conveyor into shaker pan, is then screened and returned to hopper on top of machine. All operations are controlled electrically, controls being located at right of machine.

*Steel* 8/12/46; *Item No.* 9432

## Pneumatic Bar Feed

A pneumatic bar feed for multiple spindle automatics is offered by Lipe-Rollway Corp., Syracuse, N. Y., for operation as standard for ⅞ and 1¼-in. four spindle Acme Gridley machines and as specials for most other multiple spindle machines. Feed mechanism is simple, consisting of a long cylinder to hold stock, one for each spindle. When collet on machine opens, stock is fed to stop by an air-actuated piston in each cylinder. When new bar is required, vacuum circuit retracts piston into a chamber which can be swung away, permitting loading new bar in usual manner.

Scratching or marring of surface is

impossible as there is no contact with material. Stock of any size can be used without whipping or noise. With slight modification of screw machine, it is possible to feed out at any or all stations, making it possible to make long pieces with comparatively narrow form tools.

*Steel* 8/12/46; *Item No.* 9369

## Tracing Machine

A new dry direct process printing and developing machine produces whiteprints in cut sheets or rolls, in one continuous operation at a speed of 30 fpm. Manufactured by C. F. Pease Co., Chicago,

it is easy to operate and requires minimum operator attention.

Mechanical speed control of machine is instantaneous and maximum printing speed is assured by a 75 per in. high pressure mercury tube which produces the proper light for rapid printing in an even flow over full width of tube.

Contact cylinder is cooled by same blower which forms vacuum to convey exposed prints to ammonia fume developer. After exposure tracings are stacked in a receiving tray after falling

**FOR MORE INFORMATION** on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

*Circle numbers below corresponding to those of items in which you are interested:*

| | | |
|---|---|---|
| 9125 | 9383 | 9451 |
| 9393 | 9447 | 9431 |
| 9457 | 9443 | 9430 |
| 9389 | 9305 | 9427 |
| 9497 | 9454 | 9477 |
| 9432 | 9420 | 9278 |
| 9369 | 9460 | 9578 |
| 9395 | 9441 | 9358 |
| | 9445 | |
| | 8-12-46 | |

NAME..... TITLE.....

COMPANY .....

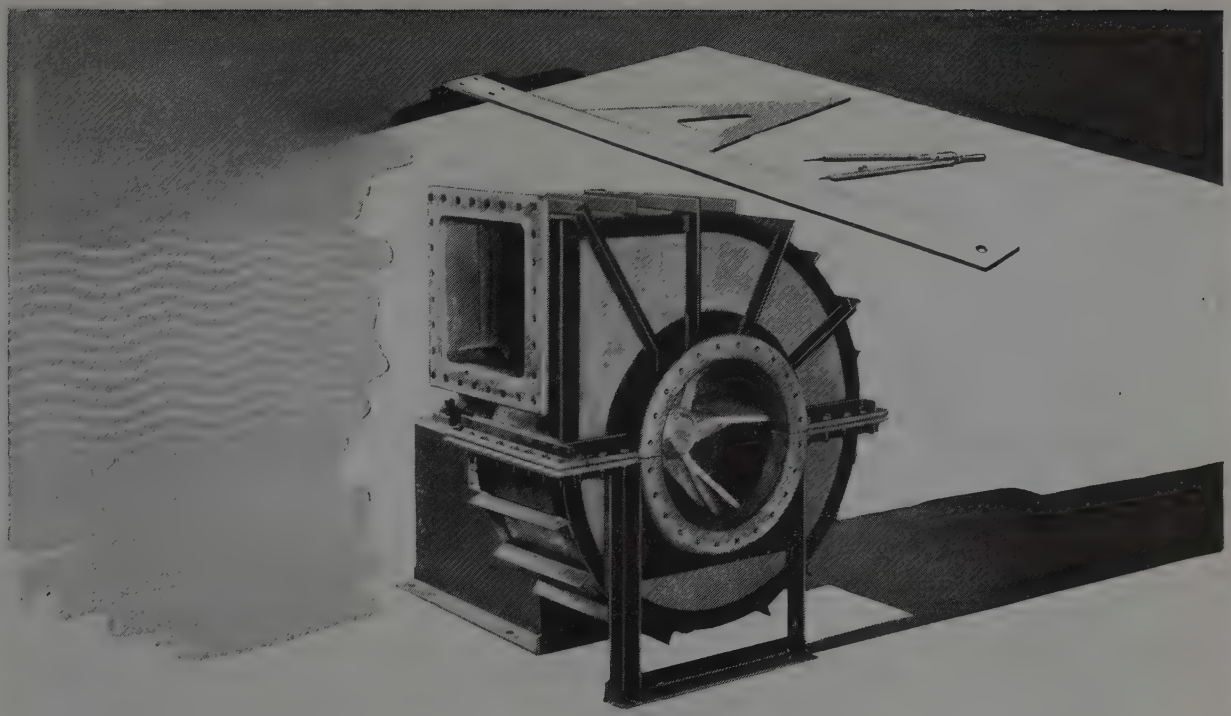
PRODUCTS MADE .....

STREET .....

CITY and ZONE..... STATE.....

**Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio**

*(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)*



# Traffic cop for "ill winds"

Hot sulphuric acid fumes are "ill winds," hard to handle in your plant. But this lead-coated and lead-lined American Blower Corrosion Resisting Fan does the trick.

**To collect or remove** other corrosive gases, vapors, fumes and smoke, there are various other types of coated, covered, lined and alloy metal fans built by American Blower. They are serving efficiently today in a wide range of industries and processes.

**Just put your problem** up to the nearest American Blower branch office. It represents headquarters for corrosion-resisting fans, air handling and conditioning equipment of every type, dust collectors, and for the famous Gyrol Fluid Drives for the smooth transmission of power and stepless variable speed control. Phone or write today—ask for Descriptive Bulletin 1241.

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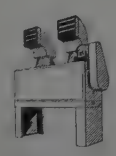
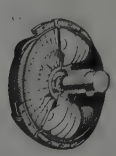
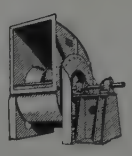
4 YEARS OF WAR-STIMULATED IMPROVEMENT—ON TOP OF 61 YEARS OF ENGINEERING DEVELOPMENT


Heating Equipment

Ventilating Equipment


Gyrol Fluid Drive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Air Conditioners

Dust Collectors

**New 6" and 4" Electric Weld Steel Tubing and Couplings**

**11,000,000 ft. 6" O.D., .109 Wall Thickness**
**3,000,000 ft. 4" O.D., .083 Wall Thickness**
**All 20 ft. lengths exact**

This tubing is new, excellent and has been hydrostatically tested to 900 pound pressure p.s.i. Every 20 foot length of tubing has welded on each end a 6" (6⅝" O.D.) or 4" (4½" O.D.) pipe nipple which is grooved for use with Victaulic type coupling.

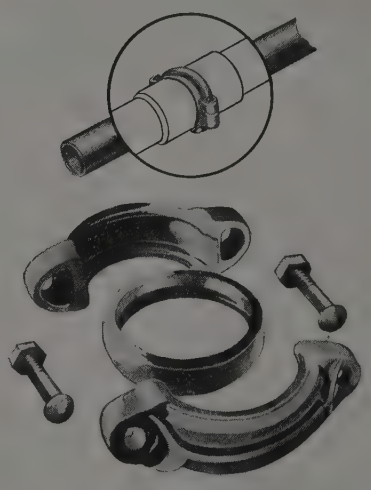
This tubing is recommended for normal use and application on steam, oil, gas and water lines, for columns and other structural purposes.

Prompt shipments can be made from various locations throughout Ohio, Pennsylvania, New York, New Jersey, Illinois, Missouri and Virginia.

Prices will be submitted upon application, and special arrangements are available to jobbers.

Representative samples of both sizes of couplings and tubing may be inspected at our various warehouses.

**Application of Coupling**



**Coupling Detail**

Albert Pipe Supply Company
Berry & North 13th Street
Brooklyn 11, New York
Phone Evergreen 7-8100

L. B. Foster Company
P.O. Box 1647
Pittsburgh 30, Pa.
Walnut 3300

Albert & Davidson Pipe Corp.
2nd Avenue—50th, 51st Street
Brooklyn 32, New York
Phone Windsor 9-6300




easily and naturally onto tape conveyor.

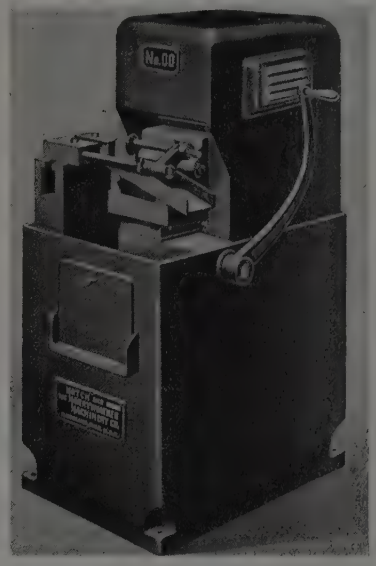
Machine, designated as model 88-R, is sturdily built, has arc welded heavy structural steel framework and 18-gage sheet metal exterior. All parts exposed to ammonia fumes are fabricated of stainless steel or aluminum.

*Steel* 8/12/46; *Item No.* 9395

## Metal Cut-Off Saw

A metal cut-off saw of rigid construction for accurate production sawing is announced by Motch & Merryweather Machinery Co., Penton building, Cleveland. Saw will cut ferrous bars up to 1¼ in. diameter, nonferrous bars to 2 in. and tubing and shapes to 2½ in.

It incorporates automatic clamping through a spring tension cam-operated mechanism linked to feed lever and




smooth saw blade drive through worm-and-gear running in oil. A choice of three saw blade speeds is offered and either 8 or 10 in. blades may be used.

Designated as No. 00, it is offered in either hand or power feed to saw carriage or it can be equipped with automatic cycling for both work and feed. It utilizes anti-friction bearing spindle and drive shaft and has a built-in coolant system.

*Steel* 8/12/46; *Item No.* 9383

## Pneumatic Wrench

A Thor pneumatic impact wrench, for driving and removing nuts, bolts and cap screws up to ⅜-in. thread size, is announced by Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago 6.

Rotatively striking impact jaws, set at a wide radius from spindle center to re-

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# HEAVY LOAD HANDLING



Ross Lift Trucks increase the capacity of your warehouse space, through higher stacking; lift as high as 24 feet (optional equipment) thus *enlarge your STOCK room, simply by increasing your STACK room!*

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**Another help in cost-cutting!** Ross Fork Lift Trucks take fewer trips—pick up, haul or stack loads up to 18,000 lbs. in a single trip! Mounted on high capacity Pneumatic Tires, they travel anywhere a truck can go . . . on rough surfaces, inside buildings or between buildings or plants. You can combine light loads into heavy loads—in bundles, boxes, crates or on Master Pallets—for quicker, easier, more economical handling.

Investigate the time-saving Economy of Ross Lift Trucks or Ross Straddle Carriers on the shipping platform, in the stock room; for loading into cars, trucks, boats or planes; for inter-plant handling or for short distance deliveries (25 to 50 miles).



**ROSS STRADDLE CARRIERS**
Safest way to carry long, odd-shaped, or bulky loads. Load underslung, giving lowest center of gravity of any vehicle—load confined between side frames, can't roll off.

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Interested in

restoring carbon

Carburizing or Preventing Decarburization?

1.—SAE 1035 steel showing decarburization before heat treatment. 2.—Same steel after short cycle heat treatment and carbon restored. 3.—After longer cycle anneal (All photomicrographs 150X).

**25 Years Experience Is Available To You**

With over 25 years research and practical experience in building successful equipment EF engineers are well qualified to help solve furnace problems involving carbon recovery.

Shown at left is an EF furnace similar to a continuous tube type special atmosphere furnace we developed in 1933, which restored carbon in heat treating shock absorber shafts.

Below is a more recent installation in which carbon is restored to small products made from hot rolled rod.

Carbon restoration may be accomplished in other EF continuous and batch type furnaces equipped with our special atmosphere control.

Possibly many other furnaces now in operation could be converted for carbon restoration or the skin recovery process.

Whether you are interested in restoring carbon; carburizing; bright hardening or annealing without decarburization; or any other heating or heat treating process, EF engineers are in position to design and build equipment to do the job.

We build production furnaces for handling material in any size, shape or quantity.

An EF continuous tube type special atmosphere furnace.

An EF gas fired radiant tube furnace heat treating bolts.

*We invite your inquiries*

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**The Electric Furnace Company**

SALEM, OHIO

GAS FIRED, OIL FIRED AND ELECTRIC FURNACES FOR ANY PROCESS - PRODUCT OR PRODUCTION

**Production Furnaces**

*For Handling Products in*

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For Every Heating and Heat Treating Process

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Annealing
Billet Heating
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Silver Soldering
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We Build the Furnace to Fit Your Job

THE ELECTRIC FURNACE CO.

SALEM, OHIO

For Production Furnaces, For Any Process or Production, Consult

**The Electric Furnace Co., Salem, Ohio**

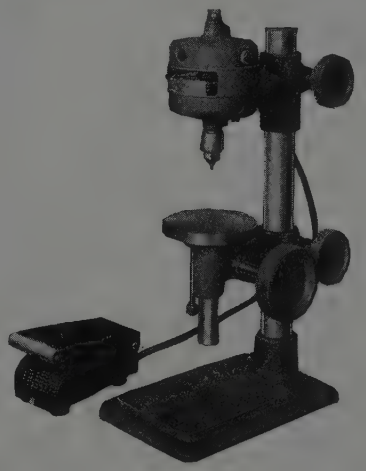
*No Job Is Too Large or Too Unusual*




duce stress, and a short, rigid spindle shank that delivers the blow close to work are the principles in impact mechanism. *Steel* 8/12/46; *Item No.* 9447

## Bench Drill

Dumore Co., Racine, Wis., announces a lightweight, high-speed bench drill for handling small metal parts. Drill head is held in desired position on polished solid steel column with a locking device, rigidly holding motor in place, yet permitting vertical adjustments and a 360 degree radius of action.



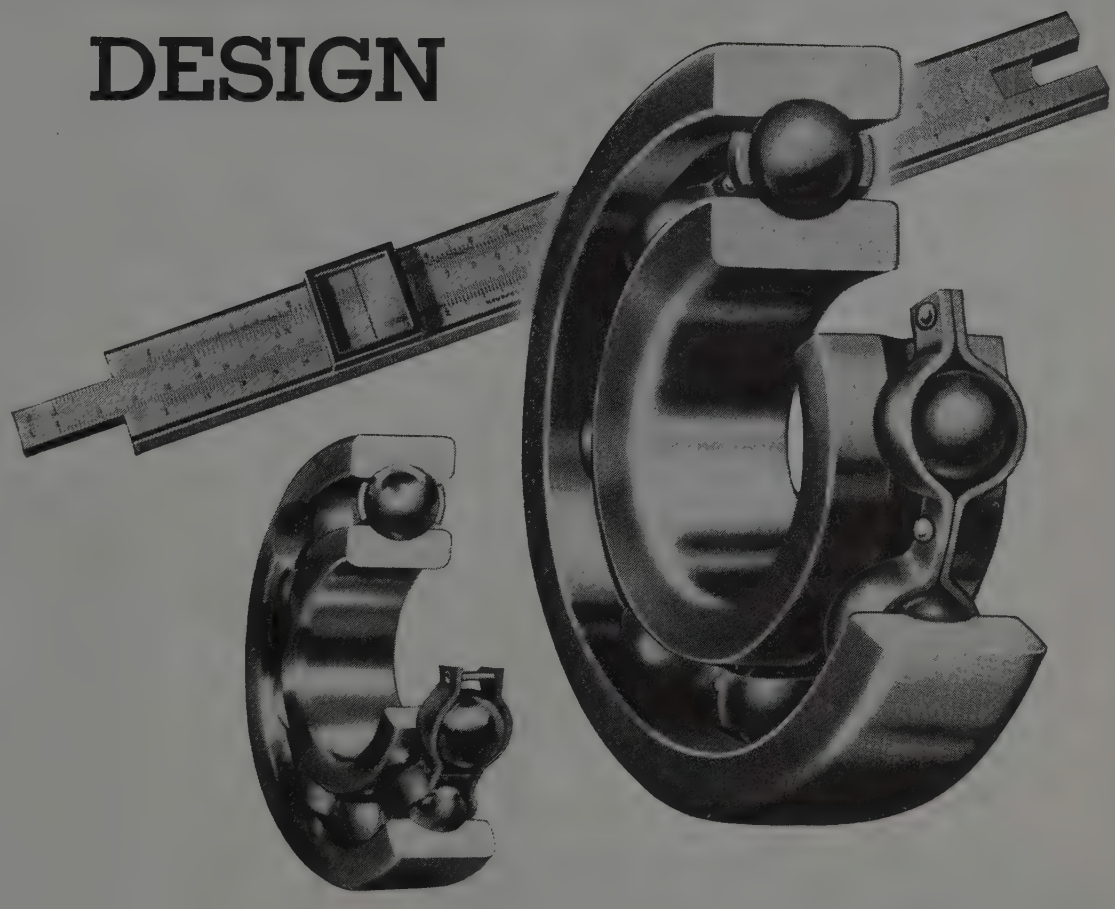
Drilling operation is accomplished by elevating table to drill through use of a hand control geared to table. Power is supplied by a 1/30 hp motor with a range of 2000 to 15,000 rpm. Speed is controlled by a foot rheostat located on floor, mounted independently of machine. *Steel* 8/12/46; *Item No.* 9443

## Positioning Equipment

Accurate direct current positioning and indicating equipment which can be operated from any alternating or direct current line is announced by Allis-Chalmers Mfg. Co., Milwaukee, for general industrial use wherever remote indication and control systems are employed. Consisting of receivers and transmitters, it is for use in governor and generator field control systems for multiple synchronized diesel-electric drives, master remote control for reversing mill motors, remote control systems for multiple diesel-electric power plant mobile units, and remote indication or control over mechanical, electrical or hydraulic devices such as level, pressure and flow indicators.

The receiver is positioning unit in which relative strength of magnetic fields of stator determines position that its permanent magnet rotor will assume.

# "KNOWN FACTORS" of EQUIPMENT DESIGN



**BCA** BALL BEARINGS have dependably served American industrial leaders for nearly 50 years. When BCA's are specified, the bearings on your equipment are known factors. Each type can be relied upon to meet specified conditions of shock, load and thrust. BCA engineering is precise . . . BCA construction is rugged . . . BCA inspection is thorough. You're sure of dependable performance with BCA's . . . one of America's *proved* ball bearings.

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BALL BEARINGS

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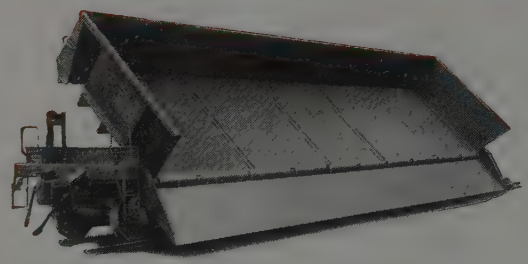
FOR GREATER HAULAGE DEPENDABILITY

FOR STEEL PRODUCERS



Rolling Trunnion Automatic Air Dump Car

This company designs and builds a wide range of cars for steel-making plants, including: • Automatic Air Dump Cars • Gondola Cars • Hot Bloom Cars • Open Hearth Pit Scrap Cars—High and Low Side Types • Flat Cars • Ingot Cars • Hot Ingot Cars • Cinder Pot Cars • Billet Cars • Ingot Trailer Trucks • Charging Cars • Coil Handling Cars • Tube Transfer Cars • Annealing Furnace Cars • Trackless Equipment for Steel Mill Service.

Hot Ingot Car

Hopper Discharge Ore Car

*Write for descriptive, technical Bulletin 72E— "Cars for Steel Plant Service."*

PRESSED STEEL CAR COMPANY, INC.

PITTSBURGH 19, PA.

NEW YORK . . . . CHICAGO . . . . ST. LOUIS . . . . ST. PAUL



Change in this relationship of field strength causes rotor to turn and assume position corresponding to the resultant of two fields.

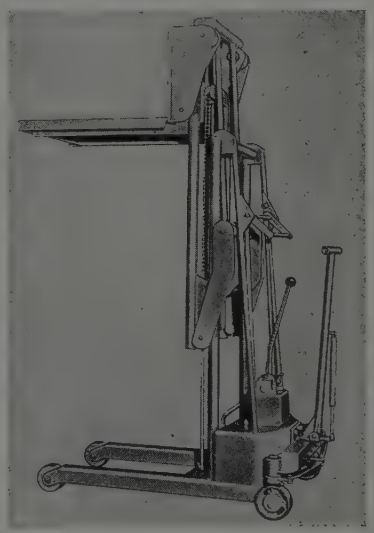
The transmitter is designed to operate any number of receivers within rated capacity at any specified direct current voltage.

Six sizes now being made range from 5 oz-in. to 360 lb-in. approximate pullout torque, with a small drip-type rectifier unit to be operated on alternating current.

*Steel* 8/12/46; *Item No.* 9305

## High-Lift Truck

To make its new hydraulic high-lift truck adaptable to higher stacking and tiering, Lyon-Raymond Corp., 2748 Madison street, Greene, N. Y. has embodied in its design a telescopic frame which increases elevated height of platform to 84 in. In lowered position the overall height



is 69 in., allowing truck to be moved through doorways and under overhead obstructions.

Telescopic section is of tubular construction, keeping weight to a minimum. An auto-type steering apparatus and widespread front wheels, provide stability.

Illustration shows truck equipped with a hand pump. A motor-driven pump also is offered for use on truck. Capacity of truck is 1000 lb.

*Steel* 8/12/46; *Item No.* 9454

## Reamer Set

N. J. Daniels Tool Co. Inc., Haverhill, Mass., is announcing a new line of hand and chucking reamers of straight and spiral fluted types of carbon and high speed steel accurate to 0.0002-in.

Reamers are manufactured in sets rang-

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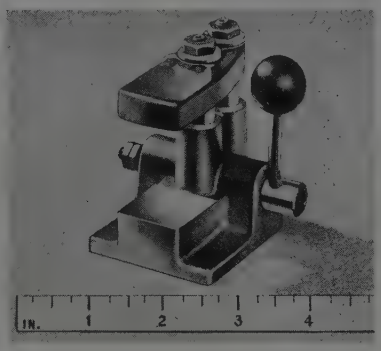
ing from ¼ to ½-in. by 16ths, to ¼ to 2 in. by 16ths. Hardwood cases contain individual reamers in transparent plastic tubes.

*Steel* 8/12/46; *Item No.* 9420

## Miniature Jigs

N. A. Woodworth Co., 1300 East Nine Mile road Detroit 20, is introducing two new miniature Cone-Lok jigs of rugged construction, that feature few moving parts. Cone-Lok mechanism utilizes great braking power of perfectly mated male and female cones.

Jigs may be quickly assembled or dismantled and can be converted from right




to left-hand operation without additional parts.

No movement of working parts is possible without action of operating lever. Tray of each unit is clamped at any location in up or down strokes. Any sudden weight or pressure applied to tray instantly throws second Cone-Lok into action, securing tray at original position. Jigs are made for working spaces of 1 x 1 x 1 in. and 1 x 2 x 1 in.

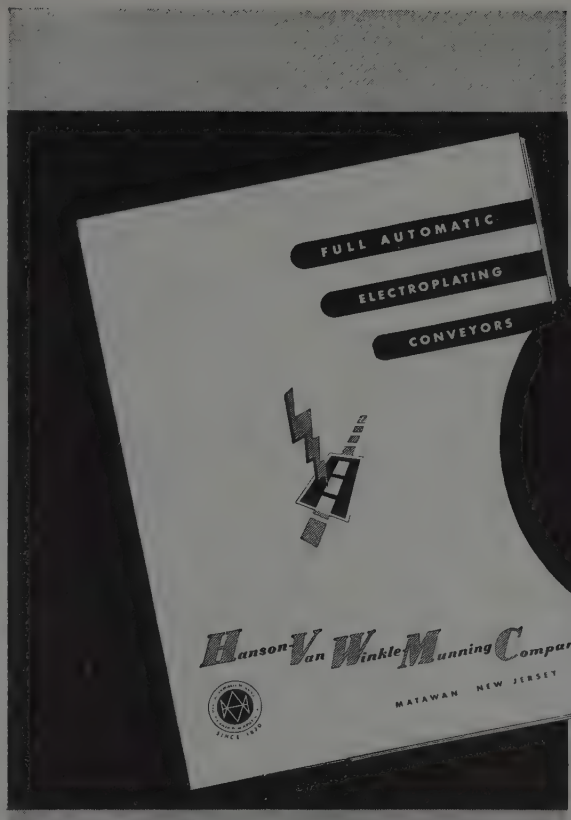
*Steel* 8/12/46; *Item No.* 9460

## Immersion Pyrometer

A new immersion pyrometer designed by Pyrometer Instrument Co., 103 Lafayette street, New York 13, for nonferrous industry, embodies a large 4¾-in. indicator with a 4 in. direct reading scale calibrated from 0 to 1500° F or 0 to 2500° F or equivalent Centigrade.

Two models with overall lengths of 27 in. and 43 in. are manufactured, both hav-

ing a swivel 8 in. from connector block which permits use of pyrometer at any angle. Swivel is equipped with tooth-shaped notches preventing it from be-

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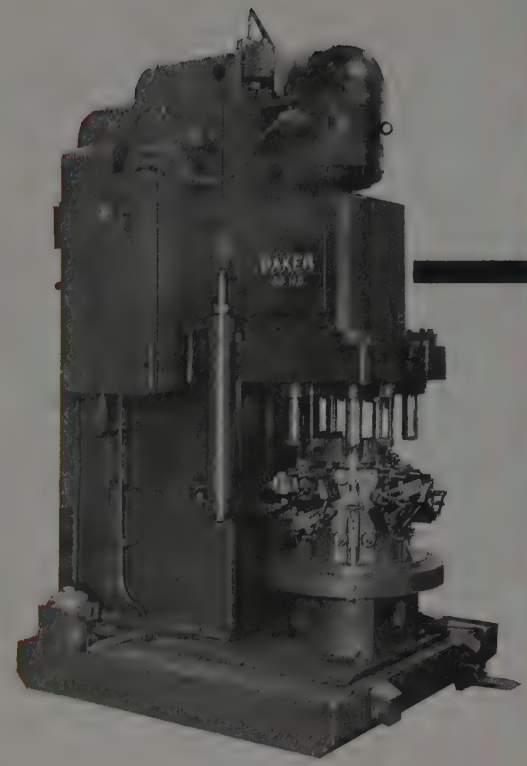


HERE ARE THE FACTS

**THIS EXTRA HEAVY DUTY VERTICAL HYDRAULIC FEED MULTIPLE SPINDLE MULTIPLE OPERATION MACHINE BY BAKER INCREASES THE OPERATOR'S HOURLY OUTPUT. WHY? BECAUSE,**

for one thing, this basic semi-automatic cycled hydraulic feed machine has special heads and fixtures for high production. The flexibility of the machine allows for change of speed, feed and cycle. Column and base are so utterly rigid cutting tools perform at maximum efficiency. The simplified driver box is mounted on saddle with provisions for pick-off speed change gears for changing feeds to spindles. A variable delivery pump is designed for varying feeds. Beautifully built, easy to keep clean, and with all major parts enclosed but easily accessible, this machine gives satisfactory day in and day out performance.

**BAKER BROTHERS** *Incorporated*

TOLEDO, OHIO, U. S. A.

coming loose during operation. Instrument can be used with bare metal and protected type thermocouples, both being interchangeable.

Enclosed thermo-electric system embodies a permanent magnet and low resistance type galvanometer. It has an internal automatic cold-end compensator in addition to an external adjusting screw. Housing assures protection from demagnetization or interference from magnetic surroundings.

*Steel* 8/12/46; *Item No.* 9441

## Hygrometer

The Aminco-Dunmore electric hygrometer for precision humidity measurement and control is announced by American Instrument Co., Silver Spring, Md. Instrument employs a sensing element which is instantly responsive to microchanges in relative humidity.

Hygrometer gives reproducible readings throughout the entire standard dry-bulb temperature range of 40° to 120° F, and relative humidity range of 7 to 100 per cent. Microchanges within plus-minus 0.5 per cent relative humidity are sensed, indicated or recorded within standard temperature range.

*Steel* 8/12/46; *Item No.* 9445

## Center Drill

Reltool Corp., Milwaukee, announces a combination center drill which includes a fillet at point where a 60° countersink angle meets the tip, to eliminate chief cause of shock and fatigue. Shock of suddenly changing cutting angle is avoided and internal strains and stresses on tool steel are spread over a greater area instead of being concentrated at one point, or at one sharp line around circumference of drill at countersink angle.

Fillet design results in more thorough lubrication of cutting edges, also prolonging tool life and helping to maintain keenness of cutting edges.

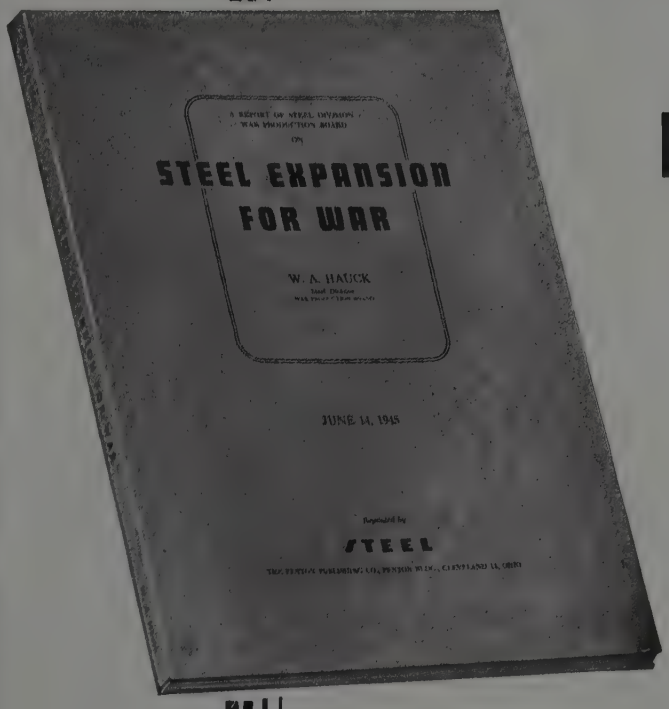
*Steel* 8/12/46; *Item No.* 9451

## Heating Unit

Electric heating units, manufactured by Industrial Chamberheat Laboratories, 2103 Centre street, West Roxbury, Mass., reduce pressure losses in air ducts by splitting air at corners by means of turning vanes incorporated into the units. Electrically insulated vanes are connected in series and provided with terminals for connecting to power source.

Heat is imparted to air or gas atmosphere by wiping action over turning vane. Volume output may be increased without altering blower. Dust cross section dimensions vary from 3 x 12 in. to 24 x 36 in.

**Facts and Figures on New and Expanded Facilities of the Steel Industry are now revealed in**




# STEEL EXPANSION FOR WAR

**By W. A. HAUCK**

*An official report by Mr. Hauck for the War Production Board*

THIS 192-page handbook is an official report prepared for the War Production, the Reconstruction Finance Corporation and other government agencies.

Much heretofore unpublished information is presented on new and revamped facilities of hundreds of plants, including those in the ore, ore transportation, coal and coke, refractory, ferro alloy, scrap, foundry and forging industries.

The report provides details on types of products, capacity increases, plant locations, costs, etc. Included are 148 photographs, plus charts and tables.

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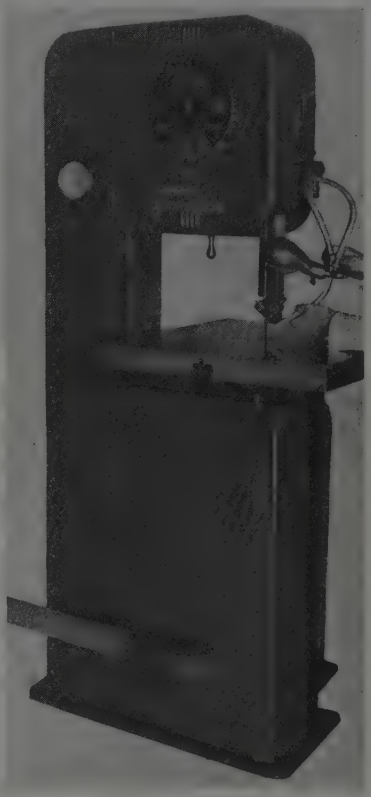
with air velocity of 1500 to 3500 fpm in all sizes. Heater capacities in Btu's per hour vary from 15,000-40,000 to 280,000-1,240,000, according to size of unit.
*Steel* 8/12/46; *Item No.* 9431

## Metal Cutting Saw

Designed primarily for light-gage steel application, the Zephyr 16-high speed metal cutting band saw manufactured by DoAll Co., Minneapolis, has an infinitely variable speed range from 1000 to 5000 fpm. The speeds enable it to cut material as fast as it can be fed into saw.

Saw table is of tilting type. Also embodied on the machine is a disk cutting



attachment for making perfect circles, a rip fence, and a mitering attachment for cutting regular and compound angles. Hardened steel saw guides with roller back-up bearing hold the saw blade firmly in making straight true cuts.
*Steel* 8/12/46; *Item No.* 9430

## Tachometer

Electric switchboard tachometers manufactured by Metron Instrument Co., 430 Lincoln street, Denver 9, utilize a new principle employing a head which consists of a contact-making mechanism connected to indicating unit by an electric cable. In operation, oscillating contacts

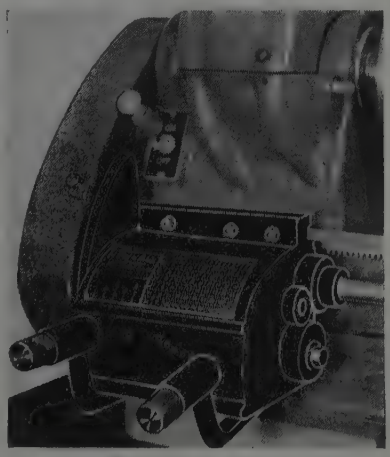
of each unit periodically charge a condenser through a direct-current milliammeter. Circuit constants are chosen so that milliammeter does not correspond to each charge but reads average current. Current is proportional to the revolutions per minute of spindle operating the contacts.

Tachometers with single or several ranges are offered They are manufactured for linear speeds as low as 1/4 fpm and rotational speeds as low as 1 rpm. They operate from 115 v ac power.

*Steel* 8/12/46; *Item No.* 9427

## Gear Box Attachment

A gear box attachment for Atlas, Craftsman, Logan, South Bend 9 in., and PowerKraft lathes is being marketed by Western Aircraft Tool Co., 650 North Hoover street, Los Angeles 4. The quick-



change box enables cutting of 4 to 224 threads per inch, with a feed of as low as 0.003-in. for fine turning.

Box is installed by drilling and tapping four holes. Gears are of hobbed steel, and gear box is of aluminum alloy casting with bronze bearings that can be replaced.

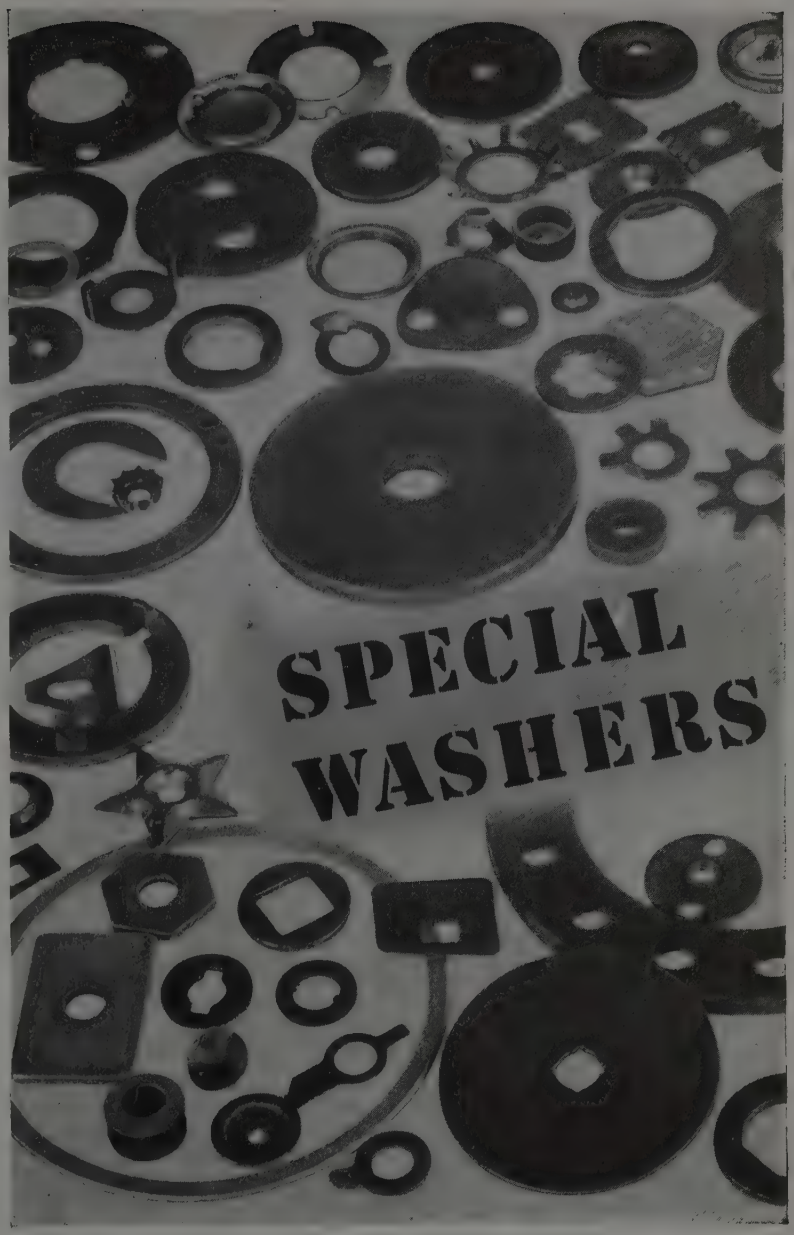
*Steel* 8/12/46; *Item No.* 9477

## Rotating Water Joint

A new type rotating water joint for cooling revolving shafts, cylinders or drums is announced by Deublin Co., Northbrook, Ill. It will also efficiently handle liquids for heating up to temperatures of 200° F.

Corrosionproof, leakproof, and frictionless, the union utilizes a helical groove on rotor which runs-counter to the direction of rotation. Sweeping action of helix prevents leakage between shaft and housing, and keeps foreign objects from lodging between the two surfaces.

Rotor is of high tensile strength stain-

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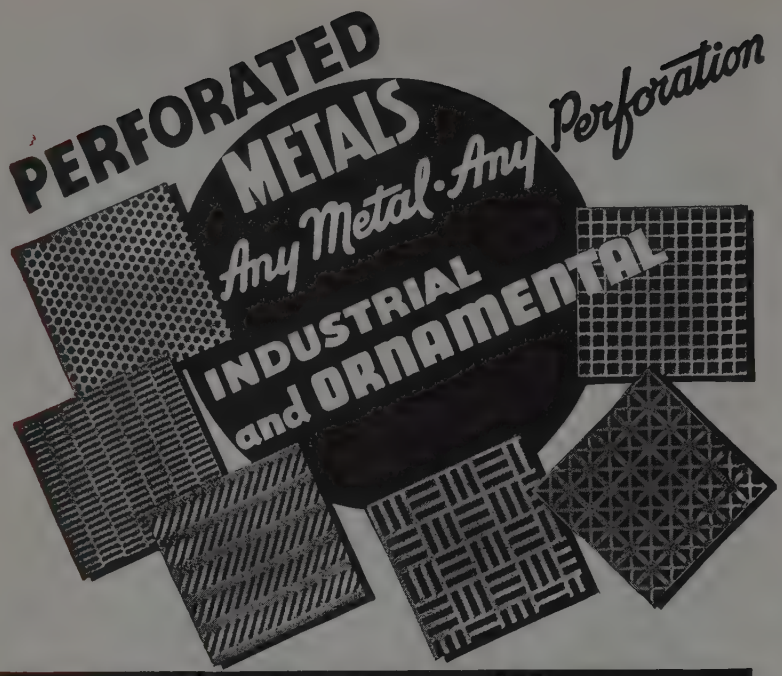


The Harrington & King PERFORATING CO.

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Illustrated above is the Models AEH to AHH series of 4-cycle single cylinder Wisconsin Air-Cooled Standard Engines, to which the following specifications apply:

| MODEL | AEH | AFH | AGH | AHH |
|---|---|---|---|---|
| Bore | 3" | 3¼" | 3½" | 3⅝" |
| Stroke | 3¼" | 4" | 4" | 4" |
| Cu. in. Displ. | 23 | 38.2 | 38.5 | 41.3 |
| Hp. Range | 4-6 | 5-7 | 6-8.5 | 7-9 |
| Weight | 130 lbs. | 170 lbs. | 175 lbs. | 180 lbs. |

If your equipment calls for an engine within the above power range, it will pay you to give serious consideration to the Wisconsin line . . . noted for rugged, heavy-duty serviceability and thorough-going dependability.

In addition to the engines listed above Wisconsin 4-cycle single cylinder engines are also available in 2 to 4 hp. sizes, and V-type 4-cylinder engines can be supplied in a power range of 13 to 30 hp. Detailed data furnished on request.

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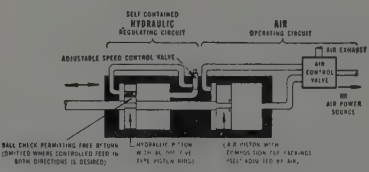
less steel and housing is of bronze. Lubricated-for-life ball bearings provide almost frictionless freedom of movement.

Four standard sizes are available in each of types, Monoflow and Duoflow. Any size can be manufactured from 1/4 to 6 in. pipe size.

*Steel* 8/12/46; *Item No.* 9278

## Air-Hydraulic Cylinder

Operation by air combined with controlled hydraulic-type regulation in the nonrotating cylinders developed by Logansport Machine Co., Logansport, Ind. These "Air-Draulic" cylinders are made with separate air and hydraulic pistons assembled as an integral unit on




a common piston rod, movements of which are powerd by the air cylinder and controlled by a 4-way air valve.

As rod with two pistons moves, oil flows between chambers of hydraulic cylinder, which are connected externally in a self-contained unit. Speed control valve regulates flow of oil and speed of piston rod movement. No hydraulic power unit is required for operation.

Manufactured with five types of mountings, four sizes from 3 to 8 in. bores are offered with stroke length up to 5 ft. Air piston is built for operation at 150 psi.

*Steel* 8/12/46; *Item No.* 9578

## Drill Jig

Manufacturers Engineering Service Inc., Toledo, O., has developed Kam-Grip drill jigs engineered for automatic operation, these are actuated by spindle of a drill press. Adaptable to drill press operations on round, square or hexagonal stock, interchangeable anvils and bushings enable the jig to handle as many as sixteen combinations of stock and drill sizes.

Attachment of lock release rod form arm of jig to drill press quill co-ordinates action of jig to action of spindle, making jig action automatic.

Jigs are offered in three models—model 47 for handling round stock from 1/8 to 5/16-in. diameter; model 52, for stock 1/8 to 9/16-in.; and model 65, for handling stock 9/16 to 7/8-in. diameter. Anvils for all square, flat or hexagon shape stock for all models require special order.

*Steel* 8/12/46; *Item No.* 9358

## Oil Cleaning System

(*Concluded from Page 77*)

the chip wringer shown in Fig. 1. Wringer extracts from 25 to 30 gal of oil from each load of chips, and since each machine sump contains about 55 gal of oil a complete supply of clean oil is furnished during each 8-hour work period.

Dirty oil from chip wringer is transferred to 250-gal dirty oil tank containing two baffles and a screen which settle and screen out the heavier particles remaining in the oil.

From the dirty oil tank (see Fig. 2) the contaminated oil passes to a purifier equipped with a combination filter element—cotton waste acting as a strainer, and fuller's earth which completes the purifying job. Purifier removes all remaining contaminants, restoring oil to its original color, odor and purity.

Purified oil is pumped into a 700-gal clean oil storage tank. As illustrated in Fig. 3, overhead distribution lines lead to machines. Each machine has its own individual outlet or return line through which flow of oil is controlled by a valve at the machine, and a convenient switch to provide pump pressure when needed.

After removal of chips from machine sump, the operator opens the return valve, pushes the wall switch and a proper amount of clean oil is returned to the machine. Clean oil is fed first to the lubricating reservoir, then it overflows into the cutting oil chamber. Same oil is used for both operations.

A self-powered sump cleaner which can be moved easily from one machine to another is used to clean out machine sumps thoroughly every three or four months. Pump cleaner can pull oil and contamination in 5 to 10 min.

System keeps oil continuously clean, fresh and at its original efficiency. There is no necessity for disposing of rank, dirty oil, and dermatitis has ceased to be a serious problem. It is reported that 25,000 gal of oil can be purified at a cost of one refill—$19.75, or 79 cents per gallon.

## Motor Booklet Offered

Synchronous motor operating characteristics, power factor, torques, flywheel effect, speeds, excitation, starting kva with some fundamental considerations of costs are discussed in 24-page booklet recently published by Electric Machinery Mfg. Co., Minneapolis. Entitled "Selection and Application of Synchronous Motors and Synchronous Motor Control," booklet has over 50 illustrations, diagrams and tables.

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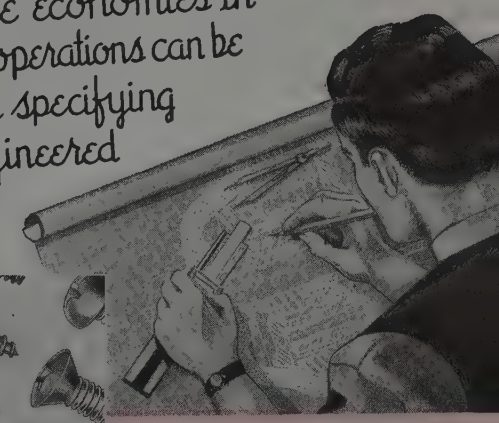

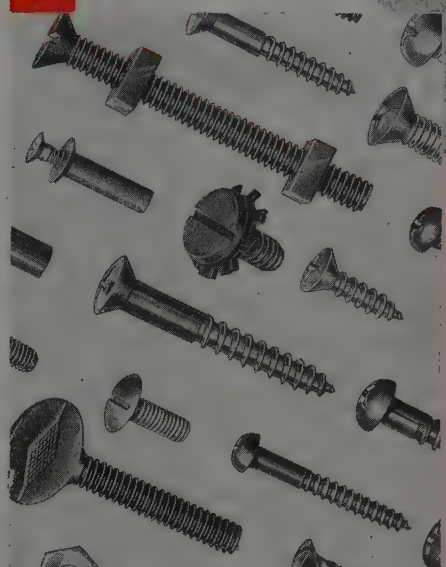

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## Hot-Dip Galvanizing

(*Continued from Page* 110)

next quarter of the sidewall and little or none to the lowest quarter of the sidewall. Thus was achieved a downward thrust to the dross, an actual assistance in its natural desire to settle to the bottom of the kettle and consequently resulting in a pure zinc galvanizing area.

This change in furnace design and the changes already referred to in the cleaning and fluxing technique, actually resulted in positive control of these three zinc-iron alloy layers. Furthermore, they achieved in many cases a reduction in dross losses which were considered normal at 35 per cent of new zinc used to under 3 per cent in the same operation, and increased the kettle life in the same plants from three to six months to four to seven years. Details of these installations are cited in a following chapter.

### Two Valuation Methods Used

The question frequently is raised as to what effect the reduction of the alloy layers had on the so-called accelerated corrosion tests. There are two main methods used to value zinc coatings. First, the Preese test which consists mainly of dipping the sample of the coated work for 1-min intervals in a solution of copper sulphate. The number of these 1-min immersions that the coating will stand before breakdown is assumed to determine the value of the coat as a corrosion resistant. Of late years it has been recognized that this test fails of its purpose and this conclusion was reached mainly because of the data obtained in the study of the structure of the coatings, including the alloy layers.

Attention is directed to Figs. 3 and 4 which are diagrammatic sketches, somewhat exaggerated, of zinc coatings on an iron base. It will be noted that the coatings of both instances are actually the same *thickness*. The three alloy layers in Fig. 3 are wide or thick while in Fig. 4 they are narrow or thin. It may be assumed that the sample shown in Fig. 3 will stand five one-minute immersions in copper sulphate, while the sample shown in Fig. 4 will only stand four.

The reason for this is plain. Copper sulphate attacks pure zinc freely and quickly, but meets with stern resistance when it reaches the alloy structure. Therefore, the greater the width of the alloy structure, the more Preese test dips the entire coating will stand. Thus, the Preese or copper sulphate test results are influenced not only by the width or thickness of the alloy layers. Consequently, any galvanizer understanding this principle can fool the

Preese test if it is used to determine the value of the coat as a corrosion resistant.

The Preese test is of great value, however, if used for the purpose of determining the continuity of the coat or, in other words, to determine the relative thickness of the same coat at all points and its uniformity. For example, if a coil of wire has been wiped closer on one side than the other so that the zinc coating is thinner on one side than on the other, the Preese test will show this at once, regardless of the alloy structure which will be the same on both sides of the wire. From this the conclusion is inevitable that any test for determining the value of a zinc coat as a protection against corrosion, based on the principle of the copper sulphate dip test, is of little value except when used for the purpose of determining how evenly the coat has been distributed.

The second method for determining the value of zinc coatings as a prevention of atmospheric corrosion is the "weight-of-coat" test.

### Porosity Governs Rate of Corrosion

It will be noted that the foregoing remarks have brought the conclusion that when iron is coated with zinc, the zinc corrodes and the iron does not; and, that the rate of corrosion is governed by the porosity of the zinc coat. Naturally then, any method of depositing the zinc on the iron which yields a porous coat will at the same time yield a coat which will corrode more rapidly than a coat obtained by a process yielding a covering of higher density.

Many attempts have been made to determine under actual atmospheric condition, the relative rates of corrosion in hot galvanized coatings between the pure zinc and the alloy layers. Although associated with many of these, the author has yet to find any which could determine any difference in the rate of breakdown between the pure zinc and the alloy. Probably the most mcoprehensive test was concluded in 1930 by Hippensteel, Borgman and Farnsworth of the Bell Telephone Laboratories who state as their conclusion, "it is apparent that in this atmosphere, the relatively pure zinc and the alloy layers of the coatings lost weight at a similar rate."

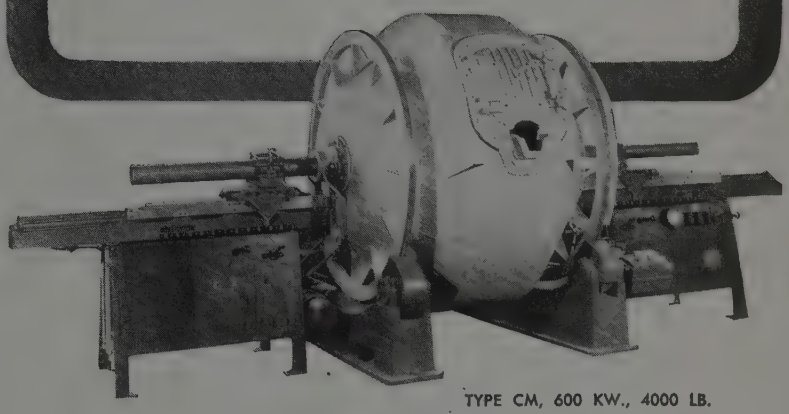
Therefore, the Preese test must now be discarded as a corrosion test and the weight-of-coat test substituted. It is the opinion of the author that the weight of coat should be as heavy as is practically possible for the type of work under consideration; at the same time, however, the coating should be of highest density obtainable.

*(To be continued)*

[1] See *Eloges Historiques*, J. K. Alibert, pp. 187 to 338 (1806).

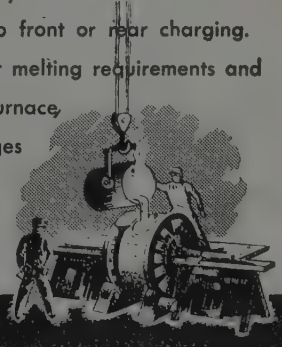
2 *Iron Age*.


25 tons OF DUPLEXED IRON IN AN 8 HOUR DAY—WITH THE EFFICIENT NEW CM DETROIT ROCKING ELECTRIC FURNACE



TYPE CM, 600 KW., 4000 LB. NOMINAL COLD CHARGE, 8000 LB. MOLTEN IRON CAPACITY.

Many foundries are producing as many as 25 tons of iron per 8-hour day by using a Detroit Rocking Electric Furnace in duplexing operations. Cupola iron is carried to the Detroit Electric Furnace, alloys are added to produce the type iron required, and the melting operation is continued—swiftly, precisely, and under the positive control of one man. One or more cold charge heats may be run while awaiting the first metal from the cupola. Each duplexed heat can be of a different alloy, or the alloy may be changed after tapping part of a heat by making any desired additions. Furnace design is adaptable to front or rear charging. We will be pleased to study your melting requirements and advise you how the Detroit Electric Furnace will give you the profitable advantages of duplexing and of producing "prescription iron."



DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

# The Business Trend

## Leveling Off Noted in Industrial Production

INDUSTRIAL PRODUCTION has leveled off but should resume an upward trend as soon as additional headway can be made in overcoming bottlenecks in supply lines. However, with a high production level already prevailing future gains likely will be progressively smaller.

In the week ended Aug. 3, STEEL's industrial production index registered 148 per cent (preliminary), or 48 per cent above the 1936-1939 weekly average. From 144 per cent in the second week of July, the index rose to 148 per cent where it remained for the last two weeks of that month.

The index would be higher now were it not for supply shortages in the automobile industry, shortage of scrap in the steel industry, and a railroad boxcar shortage that is handicapping transportation.

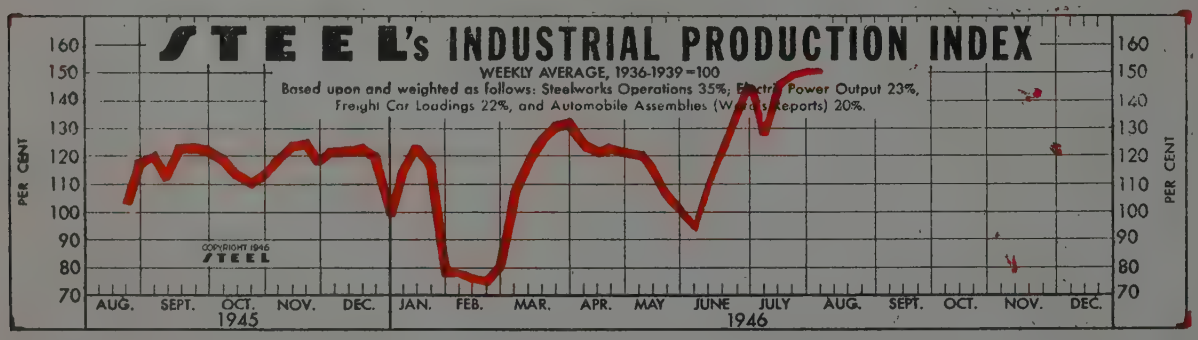
**COAL**—Helping industry show a high rate of activity is bituminous coal production, which is overcoming some of the loss incurred earlier this year during the coal strike. Output in the week ended July 27 was 12,440,000 tons, bringing total production this year to 279,110,000 tons, compared with 340,748,000 tons in the corresponding period of last year.

**PRICES**—For the week ended July 27, the Bureau of Labor Statistics index of wholesale prices for all commodities declined one-tenth of one point. Resumed governmental price control was in effect the last two days of that week, but it is not indicated how much if any of the decline resulted from revived controls, although the Bureau stated that buyers' resistance had caused a lowering of average prices of foods.

**RAILROADS**—Class I railroads of the United States in June had an estimated net income, after interest and rentals, of $13 million, compared with $65,754,740 in the corresponding month of last year. For the first half of 1946 they had an estimated deficit, after interest and rentals, of $27 million, compared with a net income of $326,801,745 in the first half of 1945.

**COKE**—Recovering from the coal strike, coke producers increased their output in June by 82.6 per cent over May. Total coke output in June was 4,738,246 tons, which consisted of 4,397,503 tons of by-product and 340,743 tons of beehive.

**ELECTRICITY**—The electric light and power industry added 800,000 new residential customers to its lines during the first half of 1946, the Edison Electric Institute reports. This showing has been made despite the housing shortage and difficulties in obtaining poles, wire, and electrical equipment. Projection of this rate of gain through the last half of 1946 would indicate 1,600,000 new residential customers for all of the year. This would nearly double the 836,000 new homes connected in 1945 and would exceed by 7 per cent the previous record high number of 1,500,000 added in 1924. Three-fourths of the new customers are in small rural areas, with most of the gains taking place in the South.




**The Index (see chart above):** Latest Week (preliminary) 148 Previous Week 148 Month Ago 126

## FIGURES THIS WEEK

| INDUSTRY | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Steel Ingot Output (per cent of capacity)‡ | 88.5 | 86.5 | 88 | 89.5 |
| Electric Power Distributed (million kilowatt hours) | 4,351 | 4,352 | 3,741 | 4,432 |
| Bituminous Coal Production (daily av.—1000 tons) | 2,073 | 2,058 | 1,991 | 1,988 |
| Petroleum Production (daily av.—1000 bbls.) | 4,881 | 4,926 | 4,905 | 4,922 |
| Construction Volume (ENR—Unit $1,000,000) | $115.7 | $140.9 | $123.5 | $76.4 |
| Automobile and Truck Output (Ward's—number units) | 78,190 | 84,720 | 45,175 | 18,690 |

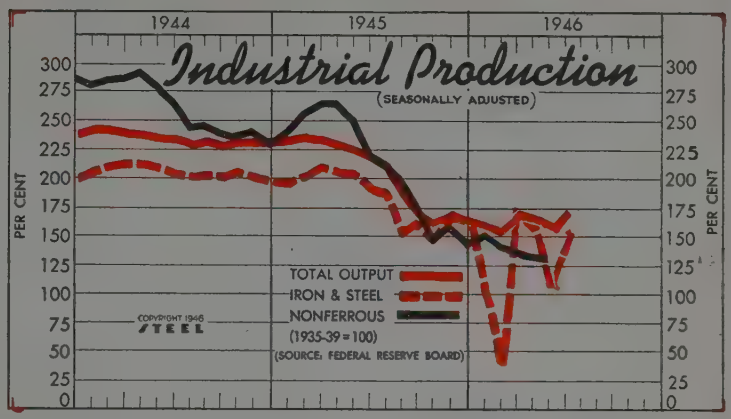
*Dates on request. †1946 weekly capacity is 1,762,381 net tons. 1945 weekly capacity was 1,831,636 net tons.

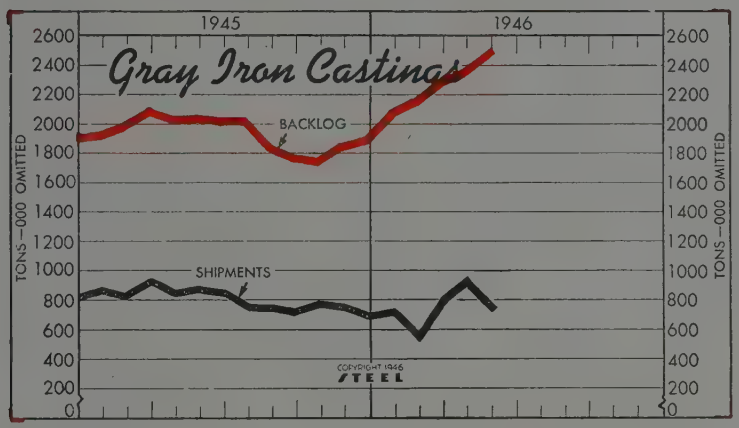
| TRADE | | | | |
|---|---|---|---|---|
| Freight Carloadings (unit—1000 cars) | 910† | 911 | 680 | 864 |
| Business Failures (Dun & Bradstreet, number) | 14 | 13 | 13 | 18 |
| Money in Circulation (in millions of dollars)‡ | $28,245 | $28,187 | $28,395 | $27,130 |
| Department Store Sales (change from like wk. a yr. ago)‡ | +33% | +28% | +38% | +22% |

†Preliminary. ‡Federal Reserve Board.

### Federal Reserve Board's Production Indexes
(1935-39=100)

| | Total Production | | Iron, Steel | | Nonferrous | |
|---|---|---|---|---|---|---|
| | 1946 | 1945 | 1946 | 1945 | 1946 | 1945 |
| Jan. | 159 | 234 | 105 | 197 | 150 | 240 |
| Feb. | 153 | 236 | 43 | 202 | 141 | 257 |
| Mar. | 168 | 235 | 169 | 210 | 133 | 265 |
| Apr. | 165 | 231 | 159 | 206 | 132 | 264 |
| May | 159 | 226 | 109 | 204 | 130 | 251 |
| June | 170 | 220 | 155 | 192 | ... | 219 |
| July | ... | 211 | ... | 187 | ... | 210 |
| Aug. | ... | 187 | ... | 155 | ... | 198 |
| Sept. | ... | 171 | ... | 163 | ... | 176 |
| Oct. | ... | 163 | ... | 146 | ... | 147 |
| Nov. | ... | 168 | ... | 167 | ... | 159 |
| Dec. | ... | 164 | ... | 165 | ... | 144 |
| Avge. | ... | 204 | ... | 183 | ... | 211 |



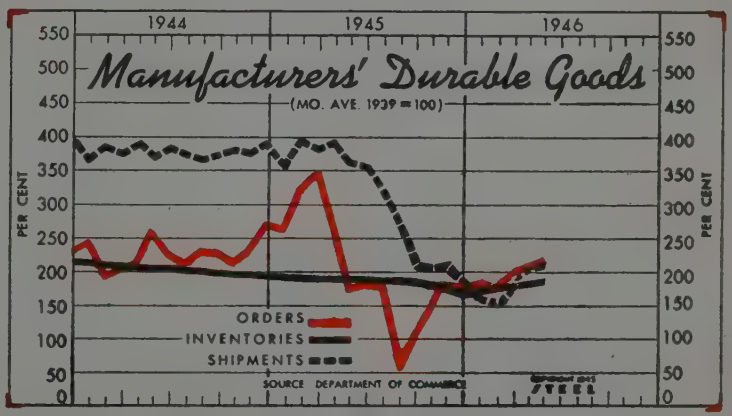

### Gray Iron Castings
(U. S. Bureau of Census)
Tons—000 omitted

| | Shipments | | Backlogs* | |
|---|---|---|---|---|
| | 1946 | 1945 | 1946 | 1945 |
| Jan. | 706 | 862 | 2,077 | 1,922 |
| Feb. | 541 | 816 | 2,153 | 1,998 |
| Mar. | 796 | 928 | 2,265 | 2,089 |
| Apr. | 857 | 843 | 2,378 | 2,032 |
| May | 757 | 867 | 2,492 | 2,031 |
| June | ... | 849 | .... | 2,016 |
| July | ... | 749 | .... | 2,015 |
| Aug. | ... | 750 | .... | 1,818 |
| Sept. | ... | 718 | .... | 1,755 |
| Oct. | ... | 767 | .... | 1,742 |
| Nov. | ... | 751 | .... | 1,847 |
| Dec. | ... | 678 | .... | 1,577 |
| Mo. Ave. | ... | 798 | .... | 1,928 |

*Unfilled orders for sale to the trade.

### Index of Manufacturers' Durable Goods
(Mo. Ave. 1939 = 100)

| | Orders | | Shipments | | Inventories | |
|---|---|---|---|---|---|---|
| | 1946 | 1945 | 1946 | 1945 | 1946 | 1945 |
| January | 176 | 267 | 169 | 354 | 171 | 190 |
| February | 179 | 326 | 153 | 394 | 174 | 189 |
| March | 203 | 351 | 183 | 382 | 181 | 189 |
| April | 214 | 267 | 204 | 389 | 182 | 189 |
| May | 218 | 177 | 209 | 361 | 185 | 189 |
| June | ... | 182 | ... | 356 | ... | 189 |
| July | ... | 179 | ... | 320 | ... | 187 |
| August | ... | 53 | ... | 262 | ... | 185 |
| September | ... | 121 | ... | 216 | ... | 185 |
| October | ... | 160 | ... | 203 | ... | 182 |
| November | ... | 171 | ... | 200 | ... | 177 |
| December | ... | 172 | ... | 199 | ... | 171 |
| Average | ... | 202 | ... | 303 | ... | 185 |




## FINANCE

| | Latest Period* | Prior Week | Month Ago | Year Ago |
|---|---|---|---|---|
| Bank Clearings (Dun & Bradstreet—millions) | $11,726 | $12,342 | $14,204 | $10,477 |
| Federal Gross Debt (billions) | $268.6 | $268.3 | $267.8 | $262.5 |
| Bond Volume, NYSE (millions) | $18.4 | $19.4 | $13.8 | $19.6 |
| Stocks Sales, NYSE (thousands) | 4,127 | 5,426 | 3,459 | 3,541 |
| Loans and Investments (billions)† | $60.5 | $60.9 | $61.7 | $63.9 |
| United States Gov't. Obligations Held (millions)† | $42,666 | $42,643 | $43,437 | $47,312 |

†Member banks, Federal Reserve System.

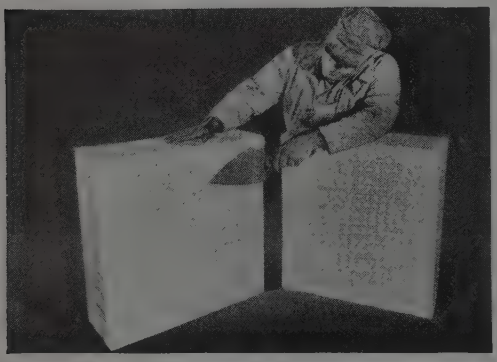
## PRICES

| | | | | |
|---|---|---|---|---|
| STEEL's composite finished steel price average | $64.45 | $64.45 | $64.45 | $58.27 |
| All Commodities† | 124.1 | 124.2 | 112.7 | 105.8 |
| Industrial Raw Materials† | 140.2 | 141.4 | 126.7 | 118.5 |
| Manufactured Products† | 119.3 | 118.9 | 107.8 | 101.9 |

†Bureau of Labor Statistics Index, 1926=100

# Only J-M FIREBLOK offers all these advantages

**Lighter Weight.** Although more than five times the size of an ordinary fire brick, a Fireblok weighs practically the same.



**Fewer Joints.** Fireblok's larger size reduces number of joints . . . cuts down on amount of cement needed for bonding (J-M 1626 Cement was specially developed for this purpose).

**Better Workability.** Fireblok are easily worked with saw, drill or rasp. Can be cut as required . . . eliminating large stocks of special shapes.

**Larger Size.** You can measure this advantage of J-M Insulating Fireblok with a yardstick! Because it is 5 times larger than ordinary brick, installation is faster . . . furnace downtime is cut to a minimum.

**Increased Thermal Efficiency**—results from Fireblok's broader, uninterrupted surfaces. Particularly recommended for industrial furnaces, flues, stacks and similar equipment . . . also for lining doors, and, when tapered, for sprung arches of exceptional stability. Like J-M Insulating Fire Brick, Fireblok comes in different types, each developed for a specific temperature range. For full details, write Johns-Manville, Box 290, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

**JM-20 Fireblok** for use up to 2000°F. Exposed or back-up.

**JM-23 Fireblok** for use up to 2300°F. Exposed or back-up.

**JM-26 Fireblok** for use up to 2600°F. Exposed or back-up.

# JOHNS-MANVILLE *First in* INSULATIONS

# HELPFUL LITERATURE

## 1. Synthetic Material

General Electric Co. — 24-page illustrated booklet entitled "Mycalex" describes stone-like electrical insulating material composed of mica and special glass. Its physical properties for industrial applications are presented. Available types, molded parts and machining practices are listed.

## 2. Bulldozers

Caterpillar Tractor Co.—16-page illustrated folder No. 9198 describes models No. 8S and 7S straight type bulldozers for use with models No. D8 and D7 tractors. Design, digging characteristics, operator's visibility, mounting and dismounting and cutting edge are fully covered and illustrated.

## 3. Variable Speed Drive

Worthington Pump & Machinery Corp.—6-page illustrated folder No. V-1400-B10A is descriptive of Allspeed drive which is available in two models having range of ¼ to ¾-horsepower with ratio of 16:1 and 1 to 3 horsepower with ratio of 9:1. Smooth stepless speed regulation is provided throughout entire range. Required speed can be selected without stopping equipment or drive motor.

## 4. Metal Fabrication

Parish Pressed Steel Co.—28-page illustrated bulletin "Past, Present and Future" depicts prewar fabrication of heavy truck frames, products produced on war contracts and present facilities which are available for production of metal products. Typical parts now being produced include wire reels, washing machine parts, passenger car frames, hoist frames and universal body sections.

## 5. Roller Bearings

Torrington Co., Bantam Bearings Div.—28-page illustrated bulletin No. 200 presents design, application and technical data on line of self-aligning spherical roller bearings. Life expectancy and capacity ratings are given. Engineering data related to bearing selection are included.

## 6. Conveyors

Rapids Standard Co. — 8-page illustrated broadside features details of Rapid-Wheel conveyor, Wheel-Ezy hand truck and Rapid Power Booster. Use of these units in materials handling operations is shown.

## 7. Engineering & Production

Pioneer Engineering & Mfg. Co.—24-page illustrated bulletin "The Answers to Industry's Problems" outlines research, engineering, accounting and production facilities of company which are available to industry. Typical products engineered by company are listed.

## 8. Seamless Tubing

Ohio Seamless Tube Co.—33-page illustrated technical handbook No. M-1 and 16-page "Master Weight Tables of Round Steel Tubing" contain useful information on seamless mechanical tubing of carbon and alloy steels.

## 9. Gear Checker

National Broach & Machine Co.—16-page illustrated bulletin No. C45-11 shows how gear dimensions can be checked accurately and quickly with the Red Ring universal gear checker. Features of machine and its use in inspection work are discussed.

## 10. Speed Indicator

Reliance Electric & Engineering Co.—8-page illustrated bulletin No. 406 is descriptive of new electric speed indicator which provides continuous, reliable speed indications in revolutions per minute or feet per minute. Scales can range from 0-750 to 0-5000 revolutions per minute.

## 11. Cutting Fluids

D. A. Stuart Oil Co. — 13-page illustrated technical bulletin No. 4 entitled "Cutting Fluids, An Appraisal and an Apology" traces development and use of cutting oils and compares laboratory and shop practices. Sulphurized and chlorinated oils are compared. Bibliography is included.

## 12. Laboratory Ware

Norton Co. — 16-page illustrated bulletin "Alundum Laboratory Ware" lists properties of this refractory material and gives dimensions and list prices of crucibles, dishes, filter cones, filtering devices, combustion boats and other units.

## 13. Prepared Atmospheres

Surface Combustion Corp. — 12-page illustrated bulletin No. SC-129 discusses prepared atmospheres for heat treating purposes. Nature of constituents of various atmospheres, effect of each and combinations used are described. Application data are given on atmospheres for various heat treating operations.

## 14. Positive Blowers

Roots-Connersville Blower Corp. — 24-page illustrated bulletin No. 22;23-B-12 describes rotary positive pressure blowers which are built in sizes ranging from 5 to 50,000 cubic feet per minute at pressures up to 30 pounds per square inch and for vacuums up to 28 inches of mercury. Performance curves, installation data, operating principle and construction features are covered.

## 15. Motorized Hand Truck

Moto-Truc Co.—8-page illustrated bulletin on the Moto-Truc Motoporter describes various models of this motorized electric hand truck. Platform, fork and skid models are shown.

## 16. Hydraulic Pump

Sundstrand Machine Tool Co., Pump Div.—12-page illustrated bulletin No. 129 describes hydraulic Circuit Control pump which provides for control of feed, traverse and direction in single compact unit. Typical hydraulic cycles obtainable with this hydraulic power unit are described.

## 17. Industrial Furnaces

Salem Engineering Co.—16-page illustrated bulletin "Salem Engineered Heat" offers services of company to users and prospective users of furnaces and allied equipment. Data are given on all types of furnaces, soaking pits and related equipment. Charts and engineering data are included.

## 18. Castings

Meehanite Research Institute—4-page illustrated bulletin No. 11 discusses use of Meehanite for cast-to-form dies. Properties available in Meehanite dies are listed for dies produced by different processes.

## 19. Crane Records

Whiting Corp.—4-page form No. N-2709 is entitled "Crane Maintenance Cost Record." It is simple record form on which to enter figures from maintenance work orders and material tickets. These records provide indication of productivity of cranes.

## 20. Portable Electric Sander

Sterling Tool Products Co.—4-page illustrated bulletin No. F-110076 presents the Sterling 1000 portable electric sander. Uses are outlined. Designed for production performance, sander is also available in complete kit with accessories. New sanding pad is described and features are outlined. Prices are given.

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## 21. Shaper

Rockford Machine Tool Co.—6-page illustrated bulletin No. 446 lists advantages, performance data, features, specifications and other data on 12-inch Hy-Draulic high speed shaper. Comparison is made with performance of conventional shapers. Other Hy-Draulic machine tools are described briefly.

## 22. Stainless Steel

Michigan Steel Casting Co., Rolled Products Div.—12-page illustrated warehouse price book of Misco rolled heat and corrosion resistant alloys lists prices and gives other data on sheets, plates, rounds, squares and other forms of special alloys.

## 23. Industrial Equipment

Ideal Industries Inc. — 24-page illustrated general catalog No. MTC-1245 covers complete line of industrial products. Included is information on E-Z Mark etcher, Air-Horse pneumatic drill, pneumatic screwdriver, rotary file and die grinder, riveting hammer, pneumatic tool accessories, dust collector for machines, Multi Duty live center, balancing ways, machine tool chucks, portable demagnetizers, granite surface plates, grinding wheel dresser, magnetic chuck and electric tachometers.

## 24. Laboratory Equipment

Wilkins-Anderson Co. — 28-page illustrated publication entitled "Waco Catalyst," Vol. VII, 1946, describes complete line of laboratory supplies and chemicals and includes price list. Laboratory glassware, electrical equipment, measurement equipment, furnaces and chemicals are described in detail.

## 25. Industrial Trucks

Mercury Mfg. Co.—48-page illustrated bulletin No. 201 contains design and application data on line of tractors, trailers, fork trucks, platform lift trucks and burden carrier trucks. Hand, electric and gasoline powered models are described. Typical uses of these trucks in materials handling operations are shown.

## 26. Rust Preventive Coatings

Nox-Rust Chemical Corp. — 24-page illustrated Tenth Anniversary catalog explains use and applications of Nox-Rust chemicals for surface coating all types of materials and products under varying requirements of use. Solvent, oil, grease and permanent types and aluminum paint and plastic strip coating are discussed. Removers, thinners and cleaners are also presented. Free offer is made.

## 27. Aluminum

Reynolds Metals Co., Aluminum Div.—8-page illustrated bulletin "Reynolds Aluminum" lists typical products which can be fabricated from this versatile metal. Facilities and services offered by company are outlined. Properties and applications of various alloys and available forms are tabulated. Typical fabricated parts, extrusions and forgings are described.

## 28. Milling & Boring Machines

Kearney & Trecker Products Corp.—16-page illustrated catalog No. T-11 presents data on No. 3 models T and TT precision milling and boring machines. Details of design and construction and recommended applications are presented. Plan dimensions and general specifications are given.

## 29. Metal Cutting Band Saw

Machine Tool Div., Kalamazoo Tank & Silo Co.—8-page illustrated catalog No. 46 presents data on portable metal cutting band saw with continuous cutting action and capable of handling 90 per cent of all cut-off operations. Built-in off the floor coolant system is feature. Details of construction are shown in illustrations.

## 30. Power Presses

Warren City Mfg. Co.—4-page illustrated folder No. 2 presents data on open back inclinable presses of stress relieved welded steel construction for stamping, drawing, blanking, coining and embossing. Design features are outlined and specifications of five sizes are given.

## 31. Variable Speed Transmissions

Portman Machine Tool Co.—25-page illustrated loose-leaf type catalog gives complete data on various models of hydraulic variable speed transmissions for machine and machine tool applications. Complete specifications of each model are set forth. Engineering data sheet for securing recommended installation information is included.

## 32. Sprinkler Systems

"Automatic" Sprinkler Corp. of America—20-page illustrated bulletin No. 56 describes wet pipe and dry pipe sprinkler systems and outlines their advantages and proper applications. Numerous types of sprinkler heads are shown for handling all types of plant protection and fire hazards. Fire-Fog and delayed action systems are also described.

## 33. Welding & Cutting

Victor Equipment Co.—52-page illustrated technical publication "Flames" discusses hand and machine flame cutting, gas welding, torch brazing and various forms of electric welding. In addition to complete data on facilities of company in welding supply field, wide range of gas and electric welding equipment and accessories is described.

## 34. Baskets & Fixtures

W. S. Tyler Co.—20-page illustrated catalog No. 73 is entitled "Tyler Baskets and Fixtures." Complete data are given on wide range of baskets and fixtures for heat treating, pickling, chemical cleaning and other corrosive operations. Also described are fabricated metal products, woven wire screens, screening machinery and other products.

## 35. Tube Fittings

Flodar Corp.—8-page illustrated catalog No. 101 describes Griptube tube fittings for sealing high fluid pressures, absorbing excessive vibrations and reducing installation and service costs. Thirteen standard types are shown and described. Features of design and advantages of use are covered.

## 36. Welding Timers

Westinghouse Electric Corp.—6-page illustrated booklet No. B-3079 describes sequence and automatic weld timers which increase weld production and reduce unproductive time. Application information and features are given. Details are presented on electronic timer for use with resistance welders.

## 37. Hydraulic Control Panels

Vickers Inc. — 16-page illustrated bulletin No. 41-10 is descriptive of line of traverse and feed cycle control panels for machine tool hydraulic circuits. Data are given on control assemblies, panels, controls and mountings. Units are available for ½ and 1-inch nominal sizes.

## 38. Blast Nozzles

Federal Foundry Supply Co.—4-page illustrated folder entitled "Cut Cleaning Costs" presents information about various types of company's blast nozzles, describes their characteristics, and discusses recommended applications and advantages. Prices are given.

## 39. Railroad Equipment

Watson-Stillman Co. — 12-page illustrated bulletin No. 560-A gives design and application data on pulling jacks, portable rail benders, and portable crank pin and forcing presses which are designed expressly for use in railroad shops.

## 40. Organic Coatings

United Chromium, Inc.—12-page illustrated bulletin "How to Pick a Winner" utilizes cartoons and explanatory copy to aid in selection of proper type of synthetic resin or organic coating for various types of surfaces. Properties of company's lacquers are given in 4-page data sheet.

## 41. Drier Rolls

Lukenweld, Inc.—8-page illustrated bulletin describes steel plate drier rolls for drying and cooling pharmaceuticals, plastics, paper, chemicals, and other materials in process. Various types of construction and finishes available, including double steel construction and labyrinth-types, are covered. Advantages are set forth.

---

TEEL 13

213 West Third St., Cleveland 13, Ohio

| | | | | |
|---|---|---|---|---|
| 1 | 11 | 21 | 31 | 41 |
| 2 | 12 | 22 | 32 | 42 |
| 3 | 13 | 23 | 33 | 43 |
| 4 | 14 | 24 | 34 | 44 |
| 5 | 15 | 25 | 35 | 45 |
| 6 | 16 | 26 | 36 | 46 |
| 7 | 17 | 27 | 37 | 47 |
| 8 | 18 | 28 | 38 | 48 |
| 9 | 19 | 29 | 39 | 49 |
| 10 | 20 | 30 | 40 | 50 |

*Please have literature circled at left sent to me.*

NAME _____ TITLE _____

COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

CITY AND STATE _____

*This card MUST be completely filled out. Please TYPE or PRINT*

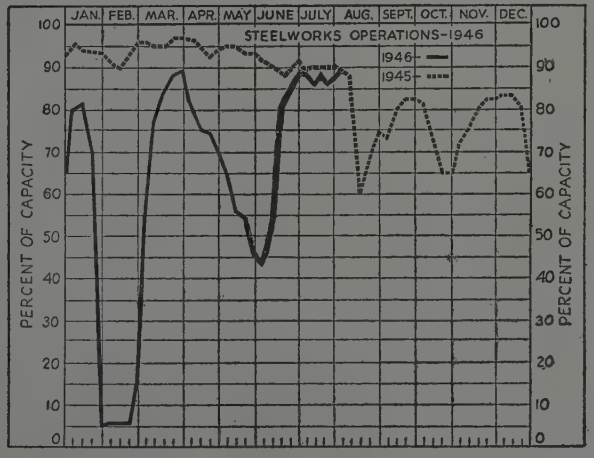
# Uncertainty Faces Mills as Preference Ratings Change

*Directions 12 and 13 to expire but CC ratings come in . . . Tonnages involved may interfere with normal distribution*

WHILE priority regulations for fourth quarter have undergone some clarification, producers of steel and pig iron still are much on the dark as to what they will be called on to supply in that period in the way of preference tonnage. Directions 12 and 13, applying to steel and pig iron, respectively, originally set up to provide essential requirements for housing, agricultural equipment and railroad brakeshoes in third quarter, will be permitted to expire Sept. 30. At the same time CC ratings will be reinstated, as of Oct. 1, to speed procurement by manufacturers of sufficient tonnage to maintain economical operation and will, through special provision, be applied also to tonnage needed in making certain items for the veterans' housing program. Precisely what this, and certain other changes, including revoking of some previously suspended ratings, will mean in terms of preference tonnage in fourth quarter remains to be seen.

However, much talk is heard of possible establishment of carbuilding steel on a preference basis, so critical has become the transportation situation. This would apply to steel needed for repairs as well as new equipment. Significant of the shortage of transportation equipment is the increase in repair schedules of railroads generally. One large eastern carrier recently increased its monthly repairs 50 per cent.

It appears likely that the government program for additional freight cars, first placed at 50,000 units, will be reduced to 40,000, if it takes tangible form. However, if the roads themselves continue ordering at the recent rate the government may not press this plan. However, preference for steel will be necessary in any event to assure completion of the cars during this year.




## DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

| | Week Ended Aug. 10 | Change | Same Week 1945 | Same Week 1944 |
|---|---|---|---|---|
| Pittsburgh | 97.5 | + 2.5 | 86 | 91 |
| Chicago | 89.5 | None | 93 | 100.5 |
| Eastern Pa. | 84 | None | 87 | 95 |
| Youngstown | 88 | None | 80 | 95 |
| Wheeling | 86 | — 7.5 | 96.5 | 96 |
| Cleveland | 92 | + 2 | 92 | 92 |
| Buffalo | 88.5 | None | 81.5 | 90.5 |
| Birmingham | 99 | None | 95 | 95 |
| New England | 75 | None | 86 | 80 |
| Cincinnati | 89 | + 4 | 87 | 87 |
| St. Louis | 49.5 | — 5 | 68 | 87 |
| Detroit | 89 | + 3 | 89 | 89 |
| Estimated national rate | 89 | + 0.5 | 88.5 | 97.5 |

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

Meanwhile, pig iron allotments set up under Direction 13 for this quarter are reliably reported to be undergoing a further screening, with manufacturers of some types of stoves not included under Direction 13 pressing for preference action to keep from being forced down completely, and with many others also applying for relief.

Preferences granted on both pig iron and steel appear to have overshot their mark as far as the practical application in the current quarter is concerned. A carryover of self-certified orders under Directions 12 and 13 at the end of September appears virtually assured and to meet such a contingency Washington has issued a new regulation providing that any carryover tonnage of this character be given CC rating for October.

In view of the continued uncertainty with respect to preference tonnage over the remainder of the year and because of severe shortage in pig iron and scrap there appears to be little likelihood of early opening of books for next year.

Estimated national steelmaking rate for last week showed little change, advancing ½-point to 89 per cent of capacity. Pittsburgh advanced 2½ points to 97½ per cent, Detroit 3 points to 89, Cleveland 2 points to 92 and Cincinnati 4 points to 89. Wheeling lost 7½ points to 86 and St. Louis 5 points to 49½. Unchanged rates were as follows: Chicago 89½, Birmingham 99, Youngstown 88, New England 75, Buffalo 88½, eastern Pennsylvania 84 and West Coast 84.

With the navigation season at approximately the midpoint, movement of Lake Superior to Aug. 1 totaled 23,848,839 gross tons, a decrease of 15,548,029 tons, 40.96 per cent, from the total at the same date last year. With some additional ships in service for the remainder of the season this deficit may be reduced. July shipments were 10,848,385 tons, only 523,897 tons, 4.61 per cent, below July, 1945.

Average composite prices of steel and iron products are unchanged, holding at OPA ceilings. Finished steel composite is $64.45, semifinished steel $40.60, steelmaking pig iron $27.50, steelmaking scrap $19.17.

# COMPOSITE MARKET AVERAGES

| | Aug. 10 | Aug. 3 | July 27 | One Month Ago July, 1946 | Three Months Ago May, 1946 | One Year Ago Aug., 1945 | Five Years Ago Aug., 1941 |
|---|---|---|---|---|---|---|---|
| **Finished Steel** | $64.45 | $64.45 | $64.45 | $64.45 | $63.54 | $58.27 | $56.73 |
| **Semifinished Steel** | 40.60 | 40.60 | 40.60 | 40.60 | 40.60 | 37.80 | 36.00 |
| Steelmaking Pig Iron | 27.50 | 27.50 | *27.50 | 27.50 | 25.50 | 24.00 | 23.00 |
| **Steelmaking Scrap** | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

*Revised.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

## Finished Material

| | Aug. 10, 1946 | July, 1946 | May, 1946 | Aug., 1945 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.50c | 2.50c | 2.50c | 2.25c |
| Steel bars, Philadelphia | 2.86 | 2.86 | 2.82 | 2.57 |
| Steel bars, Chicago | 2.50 | 2.50 | 2.50 | 2.25 |
| Shapes, Pittsburgh | 2.35 | 2.35 | 2.35 | 2.10 |
| Shapes, Philadelphia | 2.48 | 2.48 | 2.465 | 2.215 |
| Shapes, Chicago | 2.35 | 2.35 | 2.35 | 2.10 |
| Plates, Pittsburgh | 2.50 | 2.50 | 2.50 | 2.25 |
| Plates, Philadelphia | 2.558 | 2.558 | 2.55 | 2.30 |
| Plates, Chicago | 2.50 | 2.50 | 2.50 | 2.25 |
| Sheets, hot rolled, Pittsburgh | 2.425 | 2.425 | 2.425 | 2.20 |
| Sheets, cold-rolled, Pittsburgh | 3.275 | 3.275 | 3.275 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 4.05 | 4.05 | 4.05 | 3.70 |
| Sheets, hot-rolled, Gary | 2.425 | 2.425 | 2.425 | 2.20 |
| Sheets, cold-rolled, Gary | 3.275 | 3.275 | 3.275 | 3.05 |
| Sheets, No. 24 galv., Gary | 4.05 | 4.05 | 4.05 | 3.70 |
| Hot-rolled strip, over 6 to 12-in., Pitts. | 2.35 | 2.35 | 2.35 | 2.10 |
| Cold-rolled strip, Pittsburgh | 3.05 | 3.05 | 3.05 | 2.80 |
| Bright basic, bess. wire, Pittsburgh | 3.05 | 3.05 | 3.05 | 2.75 |
| Wire nails, Pittsburgh | 3.75 | 3.75 | 3.25 | 2.90 |
| Tin plate, per base box, Pittsburgh | $5.25 | $5.25 | $5.25 | $5.00 |

## Semifinished Material

| | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago | $38.00 | $38.00 | $38.00 | $36.00 |
| Slabs, Pittsburgh, Chicago | 39.00 | 39.00 | 39.00 | 36.00 |
| Rerolling billets, Pittsburgh | 39.00 | 39.00 | 39.00 | 36.00 |
| Wire rods, No. 5 to 9/32-inch, Pitts. | 2.30c | 2.30c | 2.30c | 2.15c |

## Pig Iron

| | Aug. 10, 1946 | June, 1946 | Apr., 1946 | July, 1945 |
|---|---|---|---|---|
| Bessemer del. Pittsburgh | $29.77 | $29.69 | $27.69 | $26.19 |
| Basic, Valley | 28.00 | 28.00 | 26.00 | 24.50 |
| Basic, eastern del. Philadelphia | 29.93 | 29.93 | 27.84 | 26.34 |
| No. 2 fdry., del. Pgh. N. & S. sides | 29.27 | 29.19 | 27.19 | 25.69 |
| No. 2 foundry, Chicago | 28.50 | 28.50 | 26.50 | 25.00 |
| Southern No. 2, Birmingham | 24.88 | 24.88 | 22.88 | 21.38 |
| Southern No. 2 del. Cincinnati | 28.94 | 28.94 | 26.94 | 25.44 |
| No. 2 fdry., del. Philadelphia | 30.43 | 30.43 | 28.34 | 26.84 |
| Malleable, Valley | 28.50 | 28.50 | 26.50 | 25.00 |
| Malleable, Chicago | 28.50 | 28.50 | 26.50 | 25.00 |
| Charcoal, low phos., fob Lyles, Tenn. | 33.00 | 33.00 | 33.00 | 33.00 |
| Gray forge, del. Pittsburgh | 28.69 | 28.69 | 26.69 | 25.19 |
| Ferromanganese, fob cars, Pittsburgh | 140.00 | 140.00 | 140.00 | 140.33 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, No. 1, Pittsburgh | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt, steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace ovens | $8.75 | $8.75 | $7.50 | $7.50 |
| Connellsville, foundry ovens | 9.50 | 9.50 | 8.25 | 8.25 |
| Chicago, by-product fdry., del. | 15.10 | 15.10 | 13.75 | 13.67 |

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight. Pricing on rails was changed to net ton basis as of Feb. 15, 1946.

### Semifinished Steel

**Carbon Steel Ingots:** Fob mill base, rerolling quality, standard analysis, $33.

**Alloy Steel Ingots:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $48.69.

**Rerolling, Billets, Blooms, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $39; Detroit, del., $41; Duluth (billets), $41; Pac. ports (billets), $51. (Andrews Steel Co., carbon slabs, $41; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Granite City Steel Co., $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., $58.64, Pac. ports.)

**Forging Quality Blooms, Slabs, Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $47; Detroit, del., $49; Duluth, billets, $49; forging billets fob Pac. ports, $59.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 fob Toronto, O.; Geneva Steel Co., $64.64, Pacific ports.)

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $58.48; del. Detroit $60.43; eastern Mich. $61.43.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $38. (Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, fob mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb, 2.05c.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—5/16 in. inclusive, per 100 lb, $2.30. Do., over 5/16—47-in., incl., $2.45; Galveston, base, $2.40 and $2.55, respectively. Worcester add $0.10; Pacific ports $0.50.

### Bars

**Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.:** Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham base, 20 tons one size, 2.50c; Duluth, base, 2.60c; Detroit, del., 2.60c; eastern Mich., 2.65c; New York, del., 2.86c; Phila., del., 2.86c; Gulf ports, dock, 2.85c; Pac., ports, dock, 3.15c. (Sheffield Steel Corp. may quote 2.75c, fob St. Louis; Joslyn Mfg. & Supply Co., 2.55c, fob Chicago.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon cars except base is 5 tons.

**Hot-Rolled Alloy Bars:** Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.921c; Detroit, del., 3.021c. (Texas Steel Co. may use Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.108 | 4300 | $1.839 |
| 2300 | 1.839 | 4600 | 1.298 |
| 2500 | 2.759 | 4800 | 2.326 |
| 3000 | 0.541 | 5100 | 0.379 |
| 3100 | 0.920 | 5130 or 5152 | 0.494 |
| 3200 | 1.461 | 6120 or 6152 | 1.028 |
| | | 6145 or 6150 | 1.298 |
| 3400 | 3.462 | 8612 | 0.703 |
| 4000 | 0.487 | 8720 | 0.757 |
| 4100 (.15-.25 Mo) | 0.757 | 9830 | 1.407 |
| (.20-.30 Mo) | 0.812 | | |

* Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.10c; Detroit, 3.15c; Toledo, 3.25c.

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 3.625c; Detroit, del., 3.725c, eastern Mich., 3.755c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, 2.50c; Gulf ports, dock, 2.70c; Pacific ports, dock, 2.75c.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.35c; Detroit, del., 2.45c; eastern Mich. and Toledo, del., 2.50c; Gulf ports, dock, 2.70c.

**Iron Bars:** Single refined, Pitts., 4.76c; double refined, 5.84c; Pittsburgh, staybolt, 6.22c; Terre Haute, single ref., 5.42c; double ref., 6.76c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base, 2.425c; Granite City, base, 2.525c; Detroit, del., 2.525c; eastern Mich., del., 2.575c; Phila., del., 2.615c; New York, del., 2.685c; Pacific ports, 2.975c. (Andrews Steel Co. may quote hot-rolled sheets for shipment to the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 3.00c on hot carbon sheets, Sparrows Point, Md.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Birmingham, Buffalo, Youngstown, Middletown, base, 3.275c; Granite City, base, 3.375c; Detroit, del., 3.375c; eastern Mich., del., 3.425c; New York, del., 3.615c; Phila., del., 3.635c; Pacific ports, 3.925c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 4.05c; Granite City, base, 4.15c; New York, del., 4.31c; Phila., del., 4.24c; Pacific ports, 4.60c.

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29-gage, per square, 3.73c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16-gage not corrugated, copper alloy, 4.15c; Granite City, 4.25c; Pacific ports, 4.60c; copper iron, 4.50c; pure iron, 4.50c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.60c.

**Aluminized Sheets, 20 gage:** Pittsburgh, hot-dipped, coils or cut to lengths, 9.00c.

**Enameling Sheets:** 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.20c; Granite City, base 3.30c; Detroit, del., 3.30c; eastern Mich., 3.35c; Pacific ports, 3.85c; 20-gage: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.80c; Detroit, del., 3.90c; eastern Mich., 3.95c; Pacific ports, 4.45c.

**Electrical Sheets No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.90c | 4.65c | 4.00c |
| Armature | 4.25c | 5.00c | 4.35c |
| Electrical | 4.75c | 5.50c | 4.85c |
| Motor | 5.425c | 6.175c | 5.525c |
| Dynamo | 6.125c | 6.875c | 6.225c |
| Transformer | | | |
| 72 | 6.625c | 7.375c | ..... |
| 65 | 7.625c | 8.375c | ..... |
| 58 | 8.125c | 8.875c | ..... |
| 52 | 8.925c | 9.675c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, 6-in. and narrower: Base, 2.45c; Detroit, del., 2.55c; eastern Mich., del., 2.60c; Pacific ports, 3.10c. (Superior Steel Corp. may quote 3.30c, Pitts.)

Over 6-in.: Base, 2.35c; Detroit, del., 2.45c; eastern Mich., del., 2.50c; Pacific ports, 3.00c. (Superior Steel Corp. may quote 3.20c, Pitts.)

**Cold-Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less, 3.05c; Chicago, base, 3.15c; Detroit, del., 3.15c; eastern Mich., del., 3.20c; Worcester, base, 3.25c. (Superior Steel Corp. may quote 4.70c, Pitts.)

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland base, 0.26-0.50 carbon, 3.03c. Add 0.20c for Worcester.

## Tin, Terne Plate

(OPA ceiling prices announced March 1, 1946.)

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb base box, $5.25; Granite City, Birmingham, Sparrows Point, $5.35.

**Electrolytic Tin Plate:** Pittsburgh, Gary, 100-lb base box, 0.25 lb tin, $4.60; 0.50 lb tin, $4.75; 0.75 lb tin, $4.90; Granite City, Birmingham, Sparrows Point, $4.70, $4.85, $5.00, respectively.

**Tin Mill Black Plate:** Pittsburgh, Chicago, Gary, base 29-gage and lighter, 3.30c; Granite City, Birmingham, Sparrows Point, 3.40c; Pacific ports, boxed, 4.30c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted, 4.05c; Pacific ports, 4.80c.

**Manufacturing Ternes (Special Coated):** Pittsburgh, Chicago, Gary, 100-base box, $4.55; Granite City, Birmingham, Sparrows Point; $4.65.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb $12.50; 15-lb $14.50; 20-lb $15.50 (nom.); 40-lb $20.00 (nom.)

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.50c; New York, del., 2.71c; Phila., del., 2.558c; St. Louis, 2.74c; Boston, del., 2.86c; Pacific ports, 3.05c; Gulf ports, 2.85c.

(Granite City Steel Co. may quote carbon plates 2.65c fob D.P.C. mill; Geneva Steel Co., Provo, Utah, 3.20c fob Pac. ports; Central Iron & Steel Co., Harrisburg, Pa., 2.80c, basing points; Lukens Steel Co., Coatesville, Pa., 2.75c, base; Worth Steel Co., Claymont, Del., 2.60c, base; Alan Wood Steel Co., Conshohocken, Pa., 2.75c base.)

**Floor Plates:** Pittsburgh, Chicago, 3.75c; Pacific ports, 4.40c; Gulf ports, 4.10c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.787c; Gulf ports, 4.273c; Pacific ports, 4.49c.

**Clad Steel Plates:** Coatesville, 10% cladding: nickel-clad, 18.72c; inconel-clad, 26.00c; monel-clad, 24.96c.

## Shapes

**Structural Shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.35c; New York, del., 2.54c; Phila., del., 2.48c; Pacific ports, 3.00c; Gulf ports, 2.70c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.60c, Bethlehem, Pa., on the general range and 2.70c on beams and channels from 4 to 10 inches.)

**Steel Piling:** Pittsburgh, Chicago, Buffalo, 2.65c; Pacific ports, 3.20c.

## Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham, per 100 pounds)

| | |
|---|---|
| **Wire to Manufacturers in carloads** | |
| Bright basic or bessemer | *$3.05 |
| Spring (except Birmingham) | *$4.00 |
| **Wire Products to Trade** | |
| **Nails and staples** | |
| Standard and cement-coated | †$3.75 |
| Galvanized | ††$3.40 |
| **Wire, Merchant Quality** | |
| Annealed | §$3.50 |
| Galvanized | §$3.85 |
| (Fob Pittsburgh, Chicago, Cleveland, Birmingham, per base column) | |
| **Woven fence, 15½ gage and heavier** | 72 |
| **Barbed wire, 80-rod spool** | 79 |
| **Barbless wire, twisted** | 79 |
| **Fence posts** | 74 |
| **Bale ties, single loop** | 72½ |

*Add $0.10 for Worcester, $0.05 for Duluth and $0.50 for Pacific ports.

†Add $0.30 for Worcester. $0.50 for Pacific ports. Nichols Wire & Steel may quote $4.25.

††Add $0.50 for Pacific ports.

§Add $0.10 for Worcester; $0.70 Pacific ports.

## Tubular Goods

**Welded Pipe:** Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

**Butt Weld**

| | Steel | | | Iron | |
|---|---|---|---|---|---|
| In. | Blk. | Galv. | In. | Blk. | Galv. |
| ⅛ | 53 | 30 | ⅛ | 21 | 0½ |
| ¼ & ⅜ | 56 | 37½ | ¼ | 27 | 7 |
| ½ | 60½ | 48 | 1-1¼ | 31 | 13 |
| ¾ | 63½ | 52 | 1½ | 35 | 15½ |
| 1-3 | 65½ | 54½ | 2 | 34½ | 15 |

**Boiler Tubes:** Net base prices per 100 feet fob Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

**Lap Weld**

| | Steel | | | Iron | |
|---|---|---|---|---|---|
| In. | Blk. | Galv. | In. | Blk. | Galv. |
| 2 | 58 | 46½ | 1¼ | 20 | 0½ |
| 2½-3 | 61 | 49½ | 1½ | 25½ | 7 |
| 3½-6 | 63 | 51½ | 2 | 27½ | 9 |
| 7-8 | 62 | 49½ | 2½-3½ | 28½ | 11½ |
| 9-10 | 61½ | 49 | 4 | 30½ | 15 |
| 11-12 | 60½ | 48 | 4½-8 | 29½ | 14 |
| | | | 9-12 | 25½ | 9 |

| O.D. sizes | B.W.G. | —Seamless— Hot Rolled | Cold Drawn | —Elec. Weld— Hot Rolled | Cold Rolled |
|---|---|---|---|---|---|
| 1" | 13 | ... | $9.90 | $9.36 | $9.65 |
| 1¼" | 13 | ... | 11 73 | 9.63 | 11.43 |
| 1½" | 13 | $10.91 | 12.96 | 10.63 | 12.64 |
| 1¾" | 13 | 12.41 | 14 75 | 12.10 | 14.37 |
| 2" | 13 | 13.90 | 16 52 | 13 53 | 16.19 |
| 2¼" | 13 | 15.50 | 18 42 | 15 06 | 18.03 |
| 2¼" | 12 | 17.07 | 20.28 | 16 57 | 19.83 |
| 2½" | 12 | 18 70 | 22.21 | 18.11 | 21.68 |
| 2¾" | 12 | 19.82 | 23.54 | 19.17 | 22.95 |
| 3" | 12 | 20.79 | 24 71 | 20.05 | 24.02 |
| 3½" | 11 | 26.24 | 31.18 | 25.30 | 30.29 |
| 4" | 10 | 32.56 | 38 68 | 31.32 | 37.52 |
| 4½" | 9 | 43.16 | 51.29 | ..... | ..... |
| 5" | 9 | 49.96 | 59.36 | ..... | ..... |
| 6" | 7 | 76.71 | 91.14 | ..... | ..... |

**Pipe, Cast Iron:** Class B, 6-in. and over, $60 per net ton, Birmingham; $65, Burlington, N. J.; $62.80, del., Chicago; 4-in. pipe, $5 higher. Class A pipe, $3 a ton over class B.

## Rails, Supplies

Standard rails, over 60-lb, fob mill, net ton, $43.40. Light rails (billet), Pittsburgh, Chicago, Birmingham, net ton, $49.18.

Relaying rails, 35 lb and over, fob railroad and basing points, $31-$33.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates $51 net ton, base, Standard spikes, 3.65c.

## Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago. Additional discounts: 5 for carloads; 10 for full containers, except tire, step and plow bolts.

(Ceiling prices advanced 12 per cent. effective July 27, 1946; discounts remain unchanged.)

| **Carriage and Machine** | |
|---|---|
| ½ x 6 and smaller | 65½ off |
| Do., ⅝ and ⅞ x 6-in. and shorter | 63½ off |
| Do., ¾ to 1 x 6-in. and shorter | 61 off |
| 1⅛ and larger, all lengths | 59 off |
| All diameters, over 6-in. long | 59 off |
| Tire bolts | 50 off |
| Step bolts | 56 off |
| Plow bolts | 65 off |

**Stove Bolts**

In packages, nuts separate, 71-10 off, nuts attached, 71 off; bulk, 80 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

| **Nuts** | U.S.S. | S.A.E. |
|---|---|---|
| Semifinished hex | .. | 64 |
| ⅞-in. and smaller | 62 | .. |
| ½-in. and smaller | .. | 60 |
| ½-in.-1-in. | 59 | .. |
| ⅝-in.-1-in. | 57 | 58 |
| 1⅛-in.-1½-in. | 56 | .. |
| 1⅝-in. and larger | | |

Additional discount of 10 for full kegs.

| **Hexagon Cap Screws** | |
|---|---|
| Upset 1-in., smaller | 64 off |
| Milled 1-in., smaller | 60 off |
| **Square Head Set Screws** | |
| Upset 1-in. and smaller | 71 off |
| Headless, ¼-in. larger | 60 off |
| No. 10 and smaller | 70 off |

## Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

| | |
|---|---|
| Structural | 4.75c |
| ⅞-inch and under | *65-5 off |

*Plus 12 per cent increase on base prices, effective July 26.

## Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $2.75-$3.00 off

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; Reg. carbon 15.15c; extra carbon 19.48c; special carbon 23.80c; oil-hardening 25.97c; high carbon-chromium 46.53c.

| W. | Cr. | V. | Mo. | Base, per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | ... | 72.49c |
| 1.5 | 4 | 1 | 8.5 | 58.43c |
| ..... | 4 | 2 | 8 | 58.43c |
| 6.40 | 4.15 | 1.90 | 5 | 62.22c |
| 5.50 | 4.50 | 4 | 4.50 | 75.74c |

## Stainless Steels

Base, Cents per lb

**CHROMIUM NICKEL STEELS**

| | Bars | Plates | Sheets | H. R. Strip | C. R. Strip |
|---|---|---|---|---|---|
| 302 | 25.96c | 29.21c | 36.79c | 23.93c | 30.30c |
| 303 | 28.13 | 31.38 | 38.95 | 29.21 | 35.71 |
| 304 | 27.05 | 31.38 | 38.95 | 25.45 | 32.46 |
| 308 | 31.38 | 36.79 | 44.36 | 30.84 | 37.87 |
| 309 | 38.95 | 43.28 | 50.85 | 40.03 | 50.85 |
| 310 | 53.02 | 56.26 | 57.35 | 52.74 | 60.59 |
| 312 | 38.95 | 43.28 | 53.02 | ..... | ..... |
| *316 | 43.28 | 47.61 | 51.94 | 43.28 | 51.94 |
| §321 | 31.38 | 36.79 | 44.36 | 31.65 | 41.12 |
| †347 | 35.71 | 41.12 | 48.69 | 35.71 | 45.44 |
| 431 | 20.56 | 23.80 | 31.38 | 18.94 | 24.35 |

**STRAIGHT CHROMIUM STEEL**

| | | | | | |
|---|---|---|---|---|---|
| 403 | 23.93 | 26.51 | 31.92 | 22.99 | 29.21 |
| **410 | 20.02 | 23.93 | 28.67 | 18.39 | 23.80 |
| 416 | 20.56 | 23.80 | 29.21 | 19.75 | 25.45 |
| ††420 | 25.96 | 30.84 | 36.25 | 25.70 | 39.49 |
| 430 | 20.56 | 23.80 | 31.38 | 18.94 | 24.35 |
| ††430F | 21.10 | 24.35 | 31.92 | 20.29 | 26.51 |
| 440A | 25.96 | 30.84 | 36.25 | 25.70 | 39.49 |
| 442 | 24.35 | 27.59 | 35.17 | 25.96 | 34.62 |
| 443 | 24.35 | 27.59 | 35.17 | 25.96 | 34.62 |
| 446 | 29.76 | 33.00 | 39.49 | 37.87 | 56.26 |
| 501 | 8.66 | 12.98 | 17.04 | 12.98 | 18.39 |
| 502 | 9.74 | 14.07 | 18.12 | 14.07 | 19.48 |

**STAINLESS CLAD STEEL (20%)**

(Fob Pittsburgh and Washington, Pa., plate prices include annealing and pickling.)

| | | | | | |
|---|---|---|---|---|---|
| 304 | .... | 19.48 | 20.56 | ..... | ..... |
| 410 | .... | 17.31 | 18.39 | ..... | ..... |
| 430 | .... | 17.85 | 18.94 | ..... | ..... |
| 446 | .... | 19.48 | 20.56 | ..... | ..... |

* With 2-3% molybdenum. § With titanium. † With columbium. ** Plus machining agent. †† High carbon. ‡‡ Free machining.

## Metallurgical Coke

Price Per Net Ton

| **Beehive Ovens** | |
|---|---|
| Connellsville, furnace | $7.50 |
| Connellsville, foundry | 8.50- 8.75 |
| New River, foundry | 9.00- 9.25 |
| Wise county, foundry | 7.75- 8.25 |
| Wise county, furnace | 7.25- 7.75 |
| **By-Product Foundry** | |
| Kearney, N. J. ovens | 14.40 |
| Chicago, outside delivered | 14.33 |
| Chicago, delivered | 15.10 |
| Terre Haute, delivered | 14.85 |
| Milwaukee, ovens | 15.10 |
| New England, delivered | 16.00 |
| St. Louis, delivered | †15.10 |
| Birmingham, delivered | 12 25 |
| Indianapolis, delivered | 14.85 |
| Cincinnati, delivered | 14.60 |
| Cleveland, delivered | 14.55 |
| Buffalo, delivered | 14.75 |
| Detroit, delivered | 15.10 |
| Philadelphia, delivered | 14.63 |

†15.68 from other than Ala., Mo., Tenn.

## Coke By-Products

| | |
|---|---|
| Spot, gal, freight allowed east of Omaha | |
| Pure and 90% benzol | 15.00c |
| Toluol, two degree | 27.00c |
| Solvent naphtha | 26.00c |
| Industrial xylol | 26.00c |
| Per pound fob works | |
| Phenol (car lots, returnable drums) | 11.25c |
| Do., less than carlots | 12.00c |
| Do., tank cars | 10.25c |
| Eastern plants, per pound | |
| Naphthalene flakes, balls, bbl, to jobbers | 9.00-9.50c |
| Per ton, bulk, fob plants | |
| Sulphate of ammonia | $30.00 |

# WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras. Quotations based on mill prices announced March 1, 1946.

| | Hot-rolled bars | Structural shapes | Plates | Floor plates | Hot-rolled sheets (10-gage base) | Hot-rolled strip (14-gage and lighter, 6-in and narrower) | Hot-rolled strip (12-gage and heavier wider than 6-inch) | Galvanized flat sheets (24-gage base) | Cold-rolled sheets (17-gage base) | Cold finished bars | Cold-rolled strip |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 4.35[6]1 | 4.20[3]1 | 4.20[3]1 | 6.03[9]1 | 4.05[0]1 | 5.54[8]1 | 4.41[8]1 | 5.72[5]14 | 5.03[1]14 | 4.65[6]21 | 4.965 |
| New York | 4.13[4]1 | 4.03[8]1 | 4.04[9]1 | 5.87[5]1 | 3.85[6]1 | 4.37[5]1 | 4.27[5]1 | 5.50[1]13 | 4.83[8]14 | 4.58[4]21 | 5.075 |
| Jersey City | 4.15[5]1 | 4.01[8]1 | 4.04[9]1 | 5.87[5]1 | 3.85[6]1 | 4.37[5]1 | 4.27[5]1 | 5.50[1]13 | 4.89[0]14 | 4.60[5]21 | 5.075 |
| Philadelphia | 4.11[4]1 | 3.93[7]1 | 3.87[5]1 | 5.56[4]1 | 3.77[4]1 | 4.66[4]1 | 4.55[4]1 | 5.49[9]15 | 5.13[9]16 | 4.56[4]21 | 5.064 |
| Baltimore | 4.09[3]1 | 4.05[1] | 3.86[5]1 | 5.54[3]1 | 3.64[1] | 4.29[3]1 | 4.19[3]1 | 5.36[5]17 | 5.11[8]20 | 4.54[3]21 | ..... |
| Washington | 4.23[2]1 | 4.22[1] | 4.06[7]1 | 5.63[2]1 | 3.84[2]1 | 4.43[2]1 | 4.33[2]1 | 5.66[7]17 | 5.00[7]24 | 4.53[2]21 | ..... |
| Norfolk, Va. | 4.37[7]1 | 4.30[3]1 | 4.26[2]1 | 5.77[7]1 | 4.03[7]1 | 4.92[7]1 | 4.47[7]1 | 5.86[2]17 | 4.55[2]24 | 4.67[7]21 | ..... |
| Bethlehem, Pa.* | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Claymont, Del.* | ..... | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Coatesville, Pa.* | ..... | ..... | 3.70[1] | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Buffalo (city) | 3.60[1] | 3.65[1] | 3.92[1] | 5.55[1] | 3.57[5]1 | 4.21[1] | 4.11[1] | 5.20[15] | 4.62[5]10 | 4.20[21] | 4.96 |
| Buffalo (country) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.47[5]1 | 3.85[1] | 3.75[0]1 | 5.10[15] | 4.52[5]10 | 4.10[21] | 4.60 |
| Pittsburgh (city) | 3.60[1] | 3.65[1] | 3.65[1] | 5.25[1] | 3.57[5]1 | 3.95[1] | 3.85[0]1 | 5.32[7]13 | 4.62[5]24 | 4.20[21] | 4.70 |
| Pittsburgh (country) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.47[5]1 | 3.85[1] | 3.75[0]1 | 5.10[13] | 4.52[5]24 | 4.10[21] | 4.60 |
| Cleveland (city) | 3.60[1] | 3.88[1] | 3.65[1] | 5.48[1] | 3.57[5]1 | 3.95[1] | 3.85[0]1 | 5.34[7]13 | 4.62[5]24 | 4.20[21] | 4.70 |
| Cleveland (country) | 3.50[1] | ..... | 3.55[1] | ..... | 3.47[5]1 | 3.85[1] | 3.75[0]1 | ..... | 4.52[5]24 | 4.10[21] | 4.60 |
| Detroit | 3.70[1] | 3.95[2]1 | 3.90[1] | 5.57[2]1 | 3.67[5]1 | 4.05[0]1 | 3.95[0]1 | 5.49[1]13 | 4.72[5]24 | 4.25[13] | 4.95 |
| Omaha (city, del.) | 4.32[1] | 4.37[1] | 4.37[1] | 5.97[1] | 4.04[5]1 | 4.52[1] | 4.42[1] | 6.00[15] | 5.72[24] | 4.94[5]21 | ..... |
| Omaha (country) | 4.22[1] | 4.27[1] | 4.27[1] | 5.87[1] | 3.94[5]1 | 4.42[1] | 4.32[1] | 5.90[15] | ..... | ..... | ..... |
| Cincinnati | 3.90[2]1 | 3.98[3]1 | 3.95[2]1 | 5.58[3]1 | 3.67[1]1 | 4.04[6]1 | 3.94[6]1 | 5.29[6]15 | 4.27[1]24 | 4.60[2]21 | ..... |
| Youngstown* | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4.85[19] | ..... | ..... | ..... |
| Middletown, O.* | ..... | ..... | ..... | ..... | 3.47[5]1 | 3.85[1] | 3.75[0]1 | 5.10[16] | ..... | ..... | ..... |
| Chicago (city) | 3.75[1] | 3.80[1] | 3.80[1] | 5.40[1] | 3.47[5]1 | 3.95[1] | 3.85[0]1 | ‡5.40[15] | 4.42[5]24 | 4.20[21] | 4.90 |
| Milwaukee | 3.90[8]1 | 3.95[8]1 | 3.95[8]1 | 5.55[8]1 | 3.68[3]1 | 4.10[8]1 | 4.00[8]1 | ‡5.55[8]15 | 4.58[3]24 | 4.35[8]21 | 5.05[8] |
| Indianapolis | 3.83[1] | 3.88[1] | 3.88[1] | 5.48[1] | 3.74[3]1 | 4.11[8]1 | 4.01[8]1 | 5.36[8]15 | 4.79[3]24 | 4.43[2]21 | 5.08[0] |
| St. Paul | 4.09[2]1 | 4.14[2]1 | 4.14[2]1 | 5.74[2]1 | 3.81[7]1 | 4.29[2]1 | 4.19[2]1 | 5.66[6]15 | 4.76[7]24 | 4.85[2]21 | 5.39[3] |
| St. Louis | 3.91[8]1 | 3.96[8]1 | 3.96[8]1 | 5.56[8]1 | 3.64[3]1 | 4.11[8]1 | 4.01[8]1 | 5.62[2]15 | 4.59[3]24 | 4.52[2]21 | 5.23[8] |
| Memphis, Tenn. | 4.29[6]1 | 4.34[6]1 | 4.34[6]1 | 6.07[1]1 | 4.22[1]1 | 4.59[6]1 | 4.49[6]1 | 5.74[6]15 | ..... | 4.82[1]21 | ..... |
| Birmingham | 3.75[1] | 3.80[1] | 3.80[1] | 6.15[3]1 | 3.67[5]1 | 4.05[1] | 4.05[1] | 5.20[15] | 5.07[7]24 | 4.99[7]21 | 5.46[5] |
| New Orleans (city) | 4.35[8]1 | 4.40[8]1 | 4.40[8]1 | 6.32[9]1 | 4.28[3]1 | 4.65[8]1 | ..... | 5.80[8]15 | 5.30[4]24 | 5.07[9]21 | ..... |
| Houston, Tex. | 4.00[8] | 4.50[1] | 4.50[1] | 5.75[9] | 3.98[8]1 | 4.66[8]1 | 4.56[8]1 | 5.76[3]20 | 5.81[0]16 | 4.10[20] | ..... |
| Los Angeles | 4.65[4] | 4.90[4] | 5.20[4] | 7.45[4] | 5.25[4]1 | 5.30[4] | 5.20[0]4 | 6.55[21] | 7.42[5]6 | 6.03[3]21 | 5.86[8] |
| San Francisco | 4.20[7] | 4.15[7] | 4.15[7] | 5.85[7] | 4.12[5]7 | 5.35[7] | 4.50[7] | 6.35[16] | 6.87[5]15 | 5.78[3]21 | 7.58[8] |
| Portland, Oreg. | 4.70[27] | 4.70[27] | 5.00[27] | 6.75[27] | 4.87[5]27 | 6.65[27] | 5.00[0]27 | 6.20[15] | 6.82[5]15 | 5.98[3]16 | ..... |
| Tacoma, Wash. | 4.60[6] | 4.70[6] | 5.00[6] | 6.75[6] | 4.87[5]6 | 5.80[4] | 4.60[6] | 6.40[15] | 6.55[15] | 6.23[7]21 | ..... |
| Seattle | 4.60[6] | 4.70[6] | 5.00[6] | 6.75[6] | 4.87[5]6 | 5.80[6] | 4.60[6] | 6.40[15] | 6.55[15] | 6.23[7]21 | ..... |

* Basing point cities with quotations representing mill prices, plus warehouse spread; ‡ open market price.

**BASE QUANTITIES**

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles.. [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—800 to 1999 pounds; [21]—150 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [26]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

## Ores

**Lake Superior Iron Ore**

*Gross ton, 51½% (Natural) Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $5.45 |
| Mesabi nonbessemer | 5.05 |
| High phosphorus | 5.05 |
| Mesabi bessemer | 5.20 |
| Old range nonbessemer | 5.30 |

**Eastern Local Ore**

*Cents, units, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63% contract | 18.00 |

**Foreign Ore**

*Cents per unit, c/f Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mn. | Nom. |
| N. African low phos. | Nom. |
| Swedish basic, 60 to 68% | Nom. |
| Spanish, N. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 68-69% fob Rio de Janeiro | 7.50-8.00 |

**Tungsten Ore**

| | |
|---|---|
| Chinese Wolframite, per short ton unit, duty paid | $24.00 |

**Chrome Ore**

*Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.*

*(3 $ paying for discharge; dry basis, subject to penalties if guarantees are not met.)*

Indian and African

| | |
|---|---|
| 48% 2.8:1 | $39.75 |
| 48% 3:1 | 41.00 |
| 48% no ratio | 31.00 |

South African (Transvaal)

| | |
|---|---|
| 44% no ratio | $27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |

Brazilian—nominal

| | |
|---|---|
| 44% 2.5:1 lump | $33.65 |
| 48% 3:1 lump | 43.50 |

Rhodesian

| | |
|---|---|
| 45% no ratio | $23.80 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 41.00 |

Domestic (seller's nearest rail)

| | |
|---|---|
| 48% 3:1 | $43.50 |

less $7 freight allowance.

**Manganese Ore**

Sales prices of Office of Metals Reserve, cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91c; prices include duty on imported ore and are subject to established premiums, penalties and other provisions. Price at basing points which are also points of discharge of imported manganese ore is fob cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 15c to 17c per unit less than Metal Reserve prices.

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*(Extras for alloy content)*

Basic open-hearth Electric furnace

| Designation | Chemical Composition Limits, Per Cent C | Mn | Si | Cr | Ni | Mo | Bars per 100 lb. | Billets per GT | Bars per 100 lb. | Billets per GT |
|---|---|---|---|---|---|---|---|---|---|---|
| NE 9415 | .13-.18 | .80-1.10 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | $0.812 | $16.230 | $1.353 | $27.050 |
| NE 9425 | .23-.28 | .80-1.20 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .812 | 16.230 | 1.353 | 27.050 |
| NE 9442 | .40-.45 | 1.00-1.30 | .20-.35 | .30-.50 | .30-.60 | .08-.15 | .866 | 17.312 | 1.407 | 28.132 |
| NE 9722 | .20-.25 | .50-.80 | .20-.35 | .10-.25 | .40-.70 | .15-.25 | .703 | 14.066 | 1.244 | 24.886 |
| NE 9912 | .10-.15 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.298 | 25.968 | 1.677 | 33.542 |
| NE 9920 | .18-.23 | .50-.70 | .20-.35 | .40-.60 | 1.00-1.30 | .20-.30 | 1.298 | 25.968 | 1.677 | 33.542 |

Extras are in addition to a base price of 2.921c. per pound on finished products and $58.43 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

## Pig Iron

Maximum prices per gross ton fixed by OPA schedule No. 10, last amended July 27, 1946; $2 increase may be charged on adjustable pricing contracts made between May 29 and July 27. Delivered prices do not include 3 per cent federal tax, effective Dec. 1, 1942.

| | No. 2 Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa.,** base | $29.50 | $29.00 | $30.50 | $30.00 |
| Newark, N. J., del. | 31.20 | 30.70 | 32.20 | 31.70 |
| Brooklyn, N. Y., del. | 32.28 | ..... | ..... | 32.78 |
| **Birdsboro, Pa.,** base | 29.50 | 29.00 | 30.50 | 30.00 |
| **Birmingham,** base | 24.88 | 23.50 | 29.50 | ..... |
| Baltimore, del. | 30.22 | ..... | ..... | ..... |
| Boston, del. | 29.68 | ..... | ..... | ..... |
| Chicago, del. | 28.72 | ..... | ..... | ..... |
| Cincinnati, del. | 28.94 | 28.06 | ..... | ..... |
| Cleveland, del. | 28.62 | 27.74 | ..... | ..... |
| Newark, N. J. | 30.32 | ..... | ..... | ..... |
| Philadelphia, del. | 30.05 | 29.55 | ..... | ..... |
| St. Louis, del. | 28.62 | 29.54 | ..... | ..... |
| **Buffalo,** base | 28.50 | 27.50 | 29.50 | 29.00 |
| Boston, del. | 30.06 | 29.56 | 31.06 | 30.56 |
| Rochester, del. | 30.03 | ..... | 31.03 | 30.53 |
| Syracuse, del. | 30.58 | ..... | 31.58 | 31.08 |
| **Chicago,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| Milwaukee, del. | 29.73 | 29.23 | 30.23 | 29.73 |
| Muskegon, Mich., del. | 32.05 | ..... | ..... | 32.05 |
| **Cleveland,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| Akron, Canton, del. | 30.04 | 29.54 | 30.54 | 30.04 |
| **Detroit,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| Saginaw, Mich., del. | 30.81 | 30.31 | 31.31 | 30.81 |
| **Duluth,** base | 29.00 | 28.50 | 29.50 | 29.00 |
| St. Paul, del. | 31.13 | 30.63 | 31.63 | 31.13 |
| **Erie, Pa.,** base | 28.50 | 28.00 | 29.50 | 29.00 |
| **Everett, Mass.,** base | 29.50 | 29.00 | 30.50 | 30.00 |
| Boston, del. | 30.06 | 29.56 | 31.06 | 30.56 |
| **Granite City, Ill.,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| St. Louis, del. | 29.00 | 28.50 | ..... | 29.00 |
| **Hamilton, O.,** base | 28.50 | 28.00 | ..... | 28.50 |
| Cincinnati, del. | 29.68 | 29.18 | ..... | 29.68 |
| **Neville Island, Pa.,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| *Pittsburgh, del., N.&S. sides | 29.27 | 28.77 | 29.77 | 29.27 |
| **Provo, Utah,** base | 26.50 | 26.00 | ..... | ..... |
| **Sharpsville, Pa.,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| **Sparrows Point,** base | 29.50 | 29.00 | ..... | ..... |
| Baltimore, del. | 30.60 | ..... | ..... | ..... |
| **Steelton, Pa.,** base | ..... | 29.00 | ..... | ..... |
| **Swedeland, Pa.,** base | 29.50 | 29.00 | 30.50 | 30.00 |
| Philadelphia, del. | 30.43 | 29.93 | ..... | 30.93 |
| **Toledo, O.,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| **Youngstown, O.,** base | 28.50 | 28.00 | 29.00 | 28.50 |
| Mansfield, O., del. | 30.66 | 30.16 | 31.16 | 30.66 |

* To Neville Island base add: 61c for McKees Rocks, Pa.; 93c Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.24, Oakmont, Verona; $1.38, Brackenridge.

Exceptions to above prices: Struthers Iron & Steel Co., Struthers, O., may charge 50 cents a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable pig iron. Republic Steel Corp. may quote $2 a ton higher for foundry and basic pig iron on the Birmingham base.

### High Silicon, Silvery

6.00-6.50 per cent (base) ....$34.00
6.51-7.00..$35.00 9.01- 9.50. 40.00
7.01-7.50.. 36.00 9.51-10.00. 41.00
7.51-8.00.. 37.00 10.01-10.50. 42.00
8.01-8.50.. 38.00 10.51-11.00. 43.00
8.51-9.00.. 39.00 11.01-11.50. 44.00

Fob Jackson county, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

**Electric Furnace Ferrosilicon:** Si 14.01 to 14.50%, $50 Jackson co.; each additional 0.50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 P, 0.40 Si, 1.0% C, add $1.

### Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

### Charcoal Pig Iron

Semi-cold blast, low phosphorus.

Fob furnace, Lyles, Tenn., $33.00. (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

### Gray Forge

Neville Island, Pa. .....$28.00
Valley base ..... 28.00

### Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $34.00 base; $35.38, del., Philadelphia. Intermediate phosphorus, Central Furnace, Cleveland, $31.00.

### Differentials

Basing point prices are subject to following differentials:

**Silicon:** An additional charge not to exceed 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

**Phosphorus:** A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

**Manganese:** An additional charge not to exceed 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

**Nickel:** An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

## Refractories

Per 1000, fob shipping point. Net prices

### Fire Clay Brick

Super Duty

Pa., Mo., Ky. .....$76.05

High Heat Duty

Pa., Ill., Md., Mo., Ky. ..... 60.40
Ala., Ga. ..... 60.40
N. J. ..... 65.90

Intermediate Heat Duty

Ohio ..... 52.95
Pa., Ill., Md., Mo., Ky. ..... 54.80
Ala., Ga. ..... 49.15
N. J. ..... 57.65

Low Heat Duty

Pa., Md., Ohio ..... 48.00

### Malleable Bung Brick

All bases ..... 70.45

### Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press ..... 36.45
Wire Cut ..... 34.15

### Silica Brick

Pennsylvania ..... 60.40
Joliet, E. Chicago ..... 69.30
Birmingham, Ala. ..... 60.40

### Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.
Bulk ..... 22.00
Bags ..... 26.00

### Basic Brick

Net ton, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick ..... 54.00
Chem. bonded chrome ..... 54.00
Magnesite brick ..... 76.00
Chem. bonded magnesite ..... 65.00

## Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net ton, carloads, effective $CaF_2$ content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

## Ferroalloy Prices

**Spiegeleisen:** 19-21% carlot per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

**Ferromanganese, standard:** 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Rockdale or Rockwood, Tenn. (where Tennessee Products Co. is producer), Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140 fob cars, Pittsburgh (where Carnegie-Illinois Steel Corp. is producer); add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

**Ferromanganese, low carbon:** Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.55c; regular, 21.05c; medium, 15.75c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

**Ferromanganese Briquets:** (Weight approx. 3 lb and containing exactly 2 lb Mn) per lb of briquets. Contract, carlots, bulk 0.0605c, packed 0.063c, tons 0.0655c, less 0.068c, eastern, freight allowed; 0.063c, 0.0655c, 0.0755c and 0.078c, central; 0.066c, 0.0685c, 0.0855c and 0.088c, western; spot up 0.25c.

**Ferrotungsten:** Spot 10,000 lb or more, per lb contained W, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

**Ferrotitanium:** 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5c per lb.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb contained Ti; ton lots $1.35; less-ton lots $1.40 eastern. Spot up 5c per lb.

**Ferrotitanium, High-Carbon:** 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C $142.50; 3-5% C $157.50.

**Ferrovanadium:** V 35-55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Ferromolybdenum:** 55-75% per lb. contained Mo, fob. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Ferrophosphorus:** 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrosilicon:** Contract, lump, packed; eastern zone quotations: 90-95% c.l. 12.65c, ton lots 13.10c, smaller lots 13.50c; 80-90% c.l. 10.35c, ton lots 10.85c, smaller lots 11.35c; 75% c.l. 9.40c, ton lots 9.95c, smaller lots 10.45c; 50% c.l. 7.90c, ton lots 8.50c, smaller lots 9.10c. Prices are fob shipping point, freight allowed, per lb. of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%. Deduct 0.85c for bulk carlots.

**Ferro-Boron:** (B 17.50% min., Si 1.50% max., Al 0.50% max. and C 0.50% max.) per lb of alloy contract ton lots $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

**Ferrocolumbium:** 50-60% per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices up 10 cents.

**Ferrochrome:** Contract, lump, packed; **high carbon,** eastern zone, c.l. 15.05c, ton lots 15.55c; central zone, add 0.40c and 0.65c; western zone, add 0.5c and 1.85c; **high carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c.

**Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22c, 0.2% 21.50c, 0.5% 21c, 1% 20.50c, 2% 19.50c, add 1c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l., and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carload packed differential 0.45c. Prices are per pound of contained Cr, fob shipping points. **Low carbon, high nitrogen:** Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

**Ferrochrome, Special Foundry:** (Cr 62-66%, C about 5-7%): Contract, lump, packed, eastern zone, freight allowed, c.l. 15.60c, ton lots 16.10c, less than ton 16.75c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Deduct 0.55c for bulk carlots.

**S. M. Ferrochrome, high carbon** (Cr 60-65%, Si, Mn and C 4-6% each): Contract, lump, packed, eastern zone, freight allowed, c.l. 16.15c, ton lots 16.65c, less ton 17.30c; central zone, add 0.40c for c.l. and 0.65c for smaller lots; western zone, add 0.5c for c.l. and 1.85c for smaller lots. Prices are per lb of contained chromium; spot prices 0.25c higher. Deduct 0.55c for bulk carlots.

**S.M. Ferrochrome, low carbon:** (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.50c, 20.95c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up 0.25c.

**Ferrochrome Briquets:** Containing exactly 2 lb. Cr, packed, eastern zone, c.l. 9.50c, ton lots 9.80c, less than ton 10.10c, central zone, add 0.3c for c.l. and 0.5c for smaller lots; western zone, add 0.70c for c.l. and 2c for smaller lots. Deduct 0.30c for bulk carlots. Prices per lb. of briquets; spot prices 0.25c higher.

**Chromium Metal:** 97% min. chromium, max. 0.50% carbon, eastern zone, per lb contained chromium bulk, c.l., 79.50c, 2000 lb to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; fob shipping point, freight allowed.

**Chromium-Copper:** (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

**Calcium metal; cast:** Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

**Calcium-Manganese-Silicon:** (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up 0.25c.

**Calcium - Silicon:** (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb. of alloy. Contract, carlots, lump 13.00c, ton lots 14.50c, less 15.50c eastern, freight allowed; 13.50c, 15.25c and 16.25c, central; 15.55c, 17.40c and 18.40c, western; spot up 0.25c.

**Silicon Metal:** Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l., 12.90c; 2000 lb to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% Si and max. 2% Fe, eastern, bulk; c.l., 12.50c, 2000 lb to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c, fob shipping point, freight allowed. Price per lb contained Si.

**Silicomanganese,** containing exactly 2 lb. Mn and about ½ lb. Si, eastern zone, bulk, c.l. 5.80c, ton lots 6.35c; central zone, add 0.25c for c.l. and 1c for ton lots; western, add 0.55c for c.l. and 0.20c for ton lots. **Ferrosilicon,** weighing about 5 lb. and containing exactly 2 lb. Si, or about 2½ lb. and containing exactly 1 lb. Si, packed, eastern zone, c.l. 3.90c, ton lots 4.15c, less ton lots 4.45c; central zone, add 0.15c for c.l. and 0.40c for smaller lots; western zone, add 0.30c for c.l. and 0.45c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.30c for bulk carlots.

**Manganese Metal:** (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l., 30c, 2000 lb to c.l., 32c, central, 30.25c, and 33c; western, 30.55c and 35.05c.

**Electrolytic Manganese:** 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

**Manganese-Boron:** (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) per lb of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

**Nickel-Boron:** (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance), per lb of alloy. Contract, 5 tons or more, $1.90, 1 ton to 8 ton, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

**Borosil:** 3 to 4% B, 40 to 45% Si, $6.25 lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

**Bortam:** B 1.5-1.9%, ton lots, 45c lb; less-ton lots, 50c lb.

**Carbortam:** B 0.90 to 1.15% net ton to carload, 8c per lb fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

**Silicaz Alloy:** (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up 0.25c.

**Silvaz Alloy:** (Si 35-40%, Va 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%), per lb of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up 0.25c.

**SMZ Alloy:** (Si 60-55%, Mn 5-7%, Zr 5-7% and Fe approx. 20% (per lb of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up 0.25c.

**CMSZ Alloy 4:** (Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75% and C 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up 0.25c.

**CMSZ Alloy 5:** (Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%) per lb of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c, 12.50c and 13.00c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up 0.25c.

**Zirconium Alloy:** Zr 12-15%, per lb of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot up $5 per ton.

**Zirconium Alloy:** Zr 35-40%, eastern, contract basis, carloads in bulk or package, per lb of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot up ¼c.

**Alsifer:** (Approx. 20% Al, 40% Si, 40% Fe) contract basis fob Niagara Falls, N. Y., lump per lb 5.88c; ton lots 6.38c; less 6.88c. Spot up ½c.

**Siminal:** (Approx. 20% each Si, Mn, Al) Contract, freight not exceeding St. Louis rate allowed, per lb alloy; carlots 8c; ton lots 8.75c; less-ton lots 9.25c.

**Tungsten Metal Powder:** Spot, not less than 97%, $2.50-$2.60; freight allowed as far west as St. Louis.

**Grainal:** Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

**Vanadium Pentoxide,** technical grade: Fused, approx. 89-92% $V_2O_5$ and 5.84% $NA_2O$; or air dried, 83-85% $V_2O_5$ and 5.15% $NA_2O$, $1.10 per lb contained $V_2O_5$, fob plant, freight allowed on quantities of 25 lb and over to St. Louis.

# OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. Quotations are on gross tons.

**PHILADELPHIA:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 2 Bundles | 18.75 |
| No. 3 Bundles | 16.75 |
| Mixed Borings, Turnings | 13.75 |
| Machine Shop Turnings | 13.75 |
| Billet, Forge Crops | 23.75 |
| Bar Crops, Plate Scrap | 21.25 |
| Cast Steel | 21.25 |
| Punchings | 21.25 |
| Elec. Furnace Bundles | 19.75 |
| Heavy Turnings | 18.25 |

**Cast Grades**
(Fob Shipping Point)

| | |
|---|---|
| Heavy Breakable Cast | 16.50 |
| Charging Box Cast | 19.00 |
| Cupola Cast | 20.00 |
| Unstripped Motor Blocks | 17.50 |
| Malleable | 22.00 |
| Chemical Borings | 16.51 |

**NEW YORK:**
(Dealers' buying prices)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $15.33 |
| No. 2 Heavy Melt. Steel | 15.33 |
| No. 2 Hyd. Bundles | 15.33 |
| No. 3 Hyd. Bundles | 13.33 |
| Chemical Borings | 14.33 |
| Machine Turnings | 10.33 |
| Mixed Borings, Turnings | 10.33 |
| No. 1 Cupola | 20.00 |
| Charging Box | 19.00 |
| Heavy Breakable | 16.50 |
| Unstripped Motor Blocks | 17.50 |
| Stove Plate | 19.00 |

**BOSTON:**
(Fob shipping points. Boston differential 99c higher, steelmaking grades; Providence, $1.09 higher)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.06 |
| No. 2 Heavy Melt. Steel | 14.06 |
| No. 1 Bundles | 14.06 |
| No. 2 Bundles | 14.06 |
| No. 1 Busheling | 14.06 |
| Machine Shop Turnings | 9.06 |
| Mixed Borings, Turnings | 9.06 |
| Short Shovel Turnings | 11.06 |
| Chemical Borings | 13.31 |
| Low Phos. Clippings | 16.56 |
| No. 1 Cast | 20.00 |
| Clean Auto Cast | 20.00 |
| Stove Plate | 19.00 |
| Heavy Breakable Cast | 16.50 |

**BUFFALO:**
(Delivered consumers' plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.25 |
| No. 2 Heavy Melt. Steel | 19.25 |
| No. 1 Bundles | 19.25 |
| No. 2 Bundles | 19.25 |
| No. 1 Busheling | 19.25 |
| Machine Turnings | 14.25 |
| Short Shovel Turnings | 16.25 |
| Mixed Borings, Turn. | 14.25 |
| Cast Iron Borings | 15.25 |
| No. 1 Cast | 20.00 |
| Low Phos. | 21.75 |

**PITTSBURGH:**
(Delivered consumers' plant)

| | |
|---|---|
| Railroad Heavy Melting | $21.00 |
| No. 1 Heavy Melt. Steel | 20.00 |
| No. 2 Heavy Melt. Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| No. 2 Comp. Bundles | 20.00 |
| Short Shovel Turnings | 17.00 |
| Mach. Shop Turnings | 15.00 |
| Mixed Borings, Turnings | 15.00 |
| No. 1 Cupola Cast | *20.00 |
| Heavy Breakable Cast. | *16.50 |
| Cast Iron Borings | 16.00 |
| Billet, Bloom Crops | 25.00 |
| Sheet Bar Crops | 22.50 |
| Plate Scrap, Punchings | 22.50 |
| Railroad Specialties | 24.50 |
| Scrap Rail | 21.50 |
| Axles | 26.00 |
| Rail 3 ft. and under | 23.50 |
| Railroad Malleable | 22.00 |

* Shipping point.

**CLEVELAND:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.50 |
| No. 2 Heavy Melt. Steel | 19.50 |
| No. 1 Comp. Bundles | 19.50 |
| No. 2 Comp Bundles | 19.50 |
| No. 1 Busheling | 19.50 |
| Mach. Shop Turnings | 14.50 |
| Short Shovel Turnings | 16.50 |
| Mixed Borings, Turnings | 14.50 |
| No. 1 Cupola Cast | 20.00 |
| Heavy Breakable Cast. | 16.50 |
| Cast Iron Borings | 13.50-14.00 |
| Billet, Bloom Crops | 24.50 |
| Sheet Bar Crops | 22.00 |
| Plate Scrap, Punchings | 22.00 |
| Elec. Furnace Bundles | 20.50 |

**VALLEY:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | $21.00 |
| No. 1 Heavy Melt. Steel | 20.00 |
| No. 1 Comp. Bundles | 20.00 |
| Short Shovel Turnings | 17.00 |
| Cast Iron Borings | 16.00 |
| Machine Shop Turnings | 15.00 |
| Low Phos. Plate | 22.50 |

**MANSFIELD:**
(Delivered consumer's plant)

| | |
|---|---|
| Machine Shop Turnings | $15.00 |

**CINCINNATI:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $19.50 |
| No. 2 Heavy Melt. Steel | 19.50 |
| No. 1 Comp. Bundles | 19.50 |
| No. 2 Comp. Bundles | 19.50 |
| Machine Turnings | 10.50-11.00 |
| Shoveling Turnings | 12.50-13.00 |
| Cast Iron Borings | 11.50-12.00 |
| Mixed Borings, Turnings | 10.50-11.00 |
| No. 1 Cupola Cast | 20.00 |
| Breakable Cast | 16.50 |
| Low Phosphorus | 21.00-22.00 |
| Scrap Rails | 20.50-21.00 |
| Stove Plate | 18.50-19.00 |

**DETROIT:**
(Delivered consumer's plant)

| | |
|---|---|
| Heavy Melting Steel | $17.32 |
| No. 1 Busheling | 17.32 |
| Hydraulic Bundles | 17.32 |
| Flashings | 17.32 |
| Machine Turnings | 12.32 |
| Short Shovel, Turnings | 14.32 |
| Cast Iron Borings | 13.32 |
| Low Phos. Plate | 19.82 |
| No. 1 Cast | 20.00 |
| Heavy Breakable Cast. | 16.50 |

**CHICAGO:**
(Delivered consumer's plant; cast grades fob shipping point; railroad grades fob tracks)

| | |
|---|---|
| No. 1 R.R. Heavy Melt. | $19.75 |
| No. 1 Heavy Melt. Steel | 18.75 |
| No. 2 Heavy Melt. Steel | 18.75 |
| No. 1 Ind. Bundles | 18.75 |
| No. 2 Dlr. Bundles | 18.75 |
| Baled Mach. Shop Turn. | 18.75 |
| No. 3 Galv. Bundles | 16.75 |
| Machine Turnings | 13.75 |
| Mix. Borings, Sht. Turn. | 13.75 |
| Short Shovel Turnings | 15.75 |
| Cast Iron Borings | 14.75 |
| Scrap Rails | 20.25 |
| Cut Rails, 3 feet | 22.25 |
| Cut Rails, 18-inch | 23.50 |
| Rerolling Rails | 22.25 |
| Angles, Splice Bars | 22.25 |
| Plate Scrap, Punchings | 21.25 |
| Railroad Specialties | 22.75 |
| No. 1 Cast | 20.00 |
| R.R. Malleable | 22.00 |

**ST. LOUIS:**
(Delivered consumer's plant; cast grades fob shipping point)

| | |
|---|---|
| Heavy Melting | $17.50 |
| No. 1 Locomotive Tires | 21.00 |
| Misc. Rails | 19.00 |
| Railroad Springs | 22.00 |
| Bundled Sheets | 17.50 |
| Axle Turnings | 17.00 |
| Machine Turnings | 10.50 |
| Shoveling Turnings | 12.50 |
| Rerolling Rails | 21.00 |
| Street Car Axles | 24.50 |
| Steel Rails, 3 ft. | 21.50 |
| Steel Angle Bars | 21.00 |
| Cast Iron Wheels | 20.00 |
| No. 1 Cupola Cast | 20.00 |
| Charging Box Cast | 19.00 |
| Railroad Malleable | 22.00 |
| Breakable Cast | 16.50 |
| Stove Plate | 19.00 |
| Grate Bars | 15.25 |
| Brake Shoes | 15.25 |

**BIRMINGHAM:**
(Delivered consumer's plant)

| | |
|---|---|
| Billet Forge Crops | $22.50 |
| Structural, Plate Scrap | 19.00 |
| Scrap Rails Random | 18.50 |
| Rerolling Rails | 20.50 |
| Angle Splice Bars | 20.50 |
| Solid Steel Axles | 24.00 |
| Cupola Cast | 20.00 |
| Stove Plate | 19.00 |
| Long Turnings | 11.00 |
| Cast Iron Borings | 13.00 |
| Iron Car Wheels | 20.00 |

**LOS ANGELES:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.00 |
| No. 2 Heavy Melt. Steel | 13.00 |
| No. 1, 2 Dlr. Bundles | 12.00 |
| Machine Turnings | 5.50 |
| Mixed Borings, Turnings | 5.50 |
| No. 1 Cast | 20.00 |

**SAN FRANCISCO:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $17.00 |
| No. 2 Heavy Melt. Steel | 17.00 |
| No. 1 Busheling | 17.00 |
| No. 1, No. 2 Bundles | 17.00 |
| No. 3 Bundles | 9.00 |
| Machine Turnings | 7.00 |
| Billet, Forge Crops | 15.50 |
| Bar Crops, Plate | 15.50 |
| Cast Steel | 15.50 |
| Cut, Structural, Plate 1 ft and under | 18.00 |
| Alloy-free Turnings | 7.00 |
| Tin Can Bundles | 14.50 |
| No. 2 Steel Wheels | 21.50 |
| Iron, Steel Axles | 24.00 |
| No. 2 Cast Steel | 20.50 |
| Uncut Frogs, Switches | 18.00 |
| Scrap Rails | 18.50 |
| Locomotive Tires | 20.50 |

**SEATTLE:**
(Delivered consumer's plant)

| | |
|---|---|
| No. 1 Heavy Melt. Steel | $14.50 |
| No. 2 Heavy Melt. Steel | 14.50 |
| Heavy Railroad Scrap | 15.50 |
| (Fob shipping point) | |
| No. 1 Cupola Cast | 20.00 |

# NONFERROUS METAL PRICES

**Copper:** Electrolytic or Lake from producers in carlots 14.37½c, del. Conn.; less carlots 14.50c, refinery. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 14.12½c, refinery, 20,000 lb or more; 14.37½c, less than 20,000 lb.

**Brass Ingot:** 85-5-5-5 (No. 115) 15.25c; 88-10-2 (No. 215) 18.50c; 80-10-10 (No. 305) 18.00c; No. 1 yellow (No. 405) 12.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than 20 tons.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, high grade 9.25c, E. St. Louis, for carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.40c; under 2000 lb 0.50c.

**Lead:** Common 8.10c, chemical 8.20c, corroding, 8.20c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland - Akron - Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston - Worcester, Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

**Secondary Aluminum:** Piston alloy (No. 122 type) 12.75c; No. 12 foundry alloy (No. 2 grade) 12.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 13.50c; grade 2 (92-95%) 12.50c; grade 3 (90-92%) 11.62½c; grade 4 (85-90%)10.87½c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlots; 22.50c 100 lb to c.l. Extruded 12-in. sticks 27.50c, carlots; 29.50c 100 lb to c.l.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

**Antimony:** American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; and 2c for 223 lb and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

**Nickel:** Electrolytic cathodes, 99.5%, fob refinery 35.00c lb; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c.

**Mercury:** Open market, spot, New York, $98-$100 per 76-lb flask.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be, $14.75 per lb contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.25 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.30.

**Cobalt:** 97-99%, $1.50 lb, for 550 lb (bbl.); $1.52 lb for 100 lb (case); $1.57 lb under 100 lb.

**Gold:** U. S. Treasury, $35 per ounce.

**Indium:** 99.9%, $2.25 per troy ounce.

**Silver:** Open market, N. Y. 90.12½c per ounce.

**Platinum:** $81.50 per ounce.

**Palladium:** $24 per troy ounce.

**Iridium:** $125 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 14.37½c, Conn., for copper. Freight prepaid on 100 lb or more.)

**Sheet:** Copper 25.81c; yellow brass 23.67c; commercial bronze, 95% 26.14c, 90% 25.81c; red brass, 85% 24.98c, 80% 24.66c; best quality 24.38c; phosphor bronze, grade A 4% or 5%, 43.45c; Everdur, Duronze or equiv., hot rolled, 30.88c; naval brass 28.53c; manganese bronze 31.99c; muntz metal 26.78c; nickel silver 5% 32.38c.

**Rods:** Copper, hot rolled 22.16c, cold drawn 23.16c; yellow brass 18.53c; commercial bronze, 95%-25.83c, 90% 25.50c; red brass, 85% 24.67c; 80% 24.35c; best quality 24.07c; phosphor bronze, grade A 4% or 5% 43.70c; Everdur, Duronze or equiv. cold drawn, 29.82c; naval brass 22.59c; manganese bronze 25.93c; muntz metal 22.34c; nickel silver 5% 34.44c.

**Seamless Tubing:** Copper 25.85c; yellow brass 26.43c; commercial bronze 90% 28.22c; red brass 85% 27.64c, 80% 27.32c; best quality brass 26.79c; phosphor bronze, grade A 5% 44.70c.

**Copper Wire:** Bare, soft, fob eastern mills, carlots 19.89c, less carlots 20.39c; weatherproof, fob eastern mills, carlot 22.07c, less carlots 22.57c; magnet, delivered, carlots, 23.30c, 15,000 lb or more 23.55c, less carlots 24.05c.

**Aluminum Sheets and Circles:** 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

| Gage | Width | Sheets | Circles |
|---|---|---|---|
| .249"-7 | 12"-48" | 22.70c | 25.20c |
| 8-10 | 12"-48" | 23.20c | 25.70c |
| 11-12 | 26"-48" | 24.20c | 27.00c |
| 13-14 | 26"-48" | 25.20c | 28.50c |
| 15-16 | 26"-48" | 26.40c | 30.40c |
| 17-18 | 26"-48" | 27.90c | 32.90c |
| 19-20 | 24"-42" | 29.80c | 35.30c |
| 21-22 | 24"-42" | 31.70c | 37.20c |
| 23-24 | 3"-24" | 25.60c | 29.20c |

**Lead Products:** Prices to jobbers; full sheets 11.25c; cut sheets 11.50c; pipe 9.90c, New York, 10.00c Philadelphia, Baltimore, Rochester and Buffalo, 10.50c Chicago, Cleveland, Worcester and Boston.

**Zinc Products:** Sheet fob mill, 13.15c, 36,000 lb. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb lots deduct 1%, 6000 lb 2%, 9000 lb 3%, 18,000 lb 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lb 12.50c; 100-500 lb 13.00c; under 100 lb 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## PLATING MATERIALS

**Chromic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lb to 1 ton 17.75c; under 400 lb 18.25c.

**Copper Anodes:** In 500-lb lots, fob shipping point, freight allowed, cast oval over 15 in., 25.125c; curved, 20.375c; round oval straight, 19.375c; electro-deposited, 18.875c.

**Copper Carbonate:** 52-54% metallic Cu, 250 lb barrels 20.50c.

**Copper Cyanide:** 70-71% Cu, 100-lb kegs or bbls 34.00c, fob, Niagara Falls.

**Sodium Cyanide:** 96%, 200-lb drums 15.00c; 10,000-lb lots 13.00c fob Niagara Falls.

**Nickel Anodes:** 500-2999 lb lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

**Nickel Chloride:** 100-lb kegs or 275-lb bbls 18.00c lb, del.

**Tin Anodes:** 1000 lb and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

**Tin Crystals:** 400 lb bbls 39.00c fob Grasselli, N. J.; 100-lb kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb drums 36.50c, del.; ton lots 35.50c.

**Zinc Cyanide:** 100-lb kegs or bbls 33.00c fob Niagara Falls.

## Scrap Metals

**Brass Mill Allowances:** Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 12.000 | 12.000 | 11.250 |
| Yellow brass | 9.875 | 9.625 | 9.125 |
| Commercial bronze | | | |
| 95% | 11.250 | 11.000 | 10.500 |
| 90% | 11.125 | 10.875 | 10.375 |
| Red brass | | | |
| 85% | 10.875 | 10.625 | 10.125 |
| 80% | 10.875 | 10.625 | 10.125 |
| Best quality (71-79%) | 10.500 | 10.250 | 9.750 |
| Muntz metal | 9.250 | 9.000 | 8.500 |
| Nickel silver, 5% | 10.500 | 10.250 | 5.250 |
| Phos. br., A, B, 5% | 12.750 | 12.500 | 11.500 |
| Naval brass | 9.500 | 9.250 | 8.750 |
| Manganese bronze | 9.500 | 9.250 | 8.750 |

**Other than Brass Mill Scrap:** Prices apply on material not meeting brass mill specifications and are fob shipping point; add ¾c for shipment of 60,000 lb of one group and ½c for 20,000 lb of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 11.50c; No. 2 copper wire and mixed heavy copper, copper tuyeres 10.50c

(Group 2) Soft red brass and borings, aluminum bronze 10.75c; copper-nickel solids and borings 11.00c; lined car boxes, cocks and faucets 9.50c; bell metal 17.25c; babbitt-lined brass bushings 14.75c.

(Group 3) Admiralty condenser tubes, brass pipe 8.75c; muntz metal condenser tubes 8.25c; old rolled brass 8.25c; manganese bronze solids: (lead 0%-0.40%) 8.00c; (lead 0.41%-1%) 7.00c; manganese bronze borings, 7.25c.

**Aluminum Scrap:** Price fob point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb, 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50c, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb borings and turnings one cent less than segregated.

**Lead Scrap:** Prices fob point of shipment. For soft and hard lead, including cable lead, deduct 0.75c from basing point prices for refined metal.

**Zinc Scrap:** New clippings 7.25c, old zinc 5.75c, fob point of shipment, add ½c for 10,000 lb or more. New die cast scrap 4.95c, radiator grilles 4.95c, add ½c for 20,000 lb or more. Unsweated zinc dross, die cast slab 5.80c, any quantity.

**Nickel, Monel Scrap:** Prices fob point of shipment; add ½c for 2000 lb or more of nickel or cupro-nickel shipped at one time and 20,000 lb or more of Monel. Converters (dealers) allowed 2c premium.

**Nickel:** 98% or more nickel and not over ½% copper 23.00c; 90-98% nickel, 23.00c per lb nickel contained.

**Cupro-nickel:** 90% or more combined nickel and copper 26.00c per lb contained nickel, plus 8.00c per lb contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

## Sheets, Strip . . .

*Fourth quarter preference needs hamper scheduling as extent is unknown. Output is increasing*

Sheet & Strip Prices, Page 138

**New York** — Uncertainty as to fourth quarter preference requirements precludes likelihood of early action on opening of books by leading sheet sellers for 1947. Some, in fact, doubt if there will be any action until fourth quarter is at hand.

Producers advise customers whenever the opportunity affords that if directive tonnage for them comes through for fourth quarter their allotments will be reduced accordingly. In addition to regular accounts, sellers assert they are continually being confronted by specifications from outside buyers. These inquiries are being generally rejected.

Easing in stainless sheets is ascribed to labor disturbances at plants of consumers and particularly to inability to obtain component parts needed in the assembly of manufactured products. For instance, refrigerator manufacturers, who are large consumers of stainless steel, are having to revise their schedules because of inability to get motors, making stainless tonnage available which otherwise could not have been had.

Although some cold-rolled strip sellers are accepting orders for first quarter, they are selecting tonnage carefully and are not being pinned down too definitely as to when shipments will be made in that period, as there is still question as to what and when they can count on deliveries from the hot mills after the turn of the year. Cold rollers generally are well behind on current schedules, due principally to inability to get hot rolled steel as promised.

**Cincinnati** — Current sheet output in this district is higher than the average for the first half but rolling schedules, near completion to the end of 1946, indicate no more tonnage on uncertified orders. Certified orders, for housing and agricultural implement programs, and warehouse directives have dashed hopes of some other fabricators that they achieve early production expansion. Pressure for deliveries and larger quotas continues.

**St. Louis** — Production of sheets and plates was resumed here last week after a 21-week strike shutdown of Granite City Steel Co. No new orders will be accepted until backlogs are reviewed. Prior to the shutdown sheets were booked through this year. Some space in schedules may be open for first quarter, due to order cancellations. The mill has ample scrap and pig iron and all furnaces will be in operation probably in 10 days.

**Cleveland**—Flat-rolled steel producers had varied experiences regarding the displacement of tonnage by certified orders for September. Orders certified amounted to as little as 20 per cent in some cases and 40 per cent in others. On some products, such as heavy flat-rolled and galvanized sheet, the percentage reached 50 per cent.

Only a few CC and MM rated orders are on books as these did not become binding until Aug. 6. A few special directives, in most cases only three or four to each producer, have been issued to aid buyers under special conditions.

Producers have screened certified orders carefully and in some cases have been reluctant to accept full tonnage which appeared out of line with allotments to other customers. However, appeals to authorities in Washington have been rejected, virtually forcing producers to accept some orders against better judgement.

**Pittsburgh** — Pressure for prompt shipment is acute. Production outlook is brighter than at any time this year, but no significant relief is indicated until late fourth quarter at the earliest, when increased finishing capaciy will be available. Earlier this year CPA predicted a 300,000-ton annual increase in sheetmaking capacity by end of 1946. Current tight supply in sheets is reflected in the recent request of the Steel Shipping Containers Industry Advisory Committee for increased sheet tonnage. Heavy container manufacturers are said to be obtaining only about 35 per cent of their requirements, and industry members point out that if the present lack of sheets continues every major industry will be affected for nearly all use containers, either directly or indirectly. CPA appears to be taking the position, however, that any effort to extend priorities aid would dislocate present distribution of steel sheets without relieving the shortage.

**Philadelphia** — Despite higher operations sheet sellers report little progress in catching up on orders. In fact, due to directive tonnage, some declare they have actually lost ground in recent weeks. Those operating on a quarterly quota basis will be unable to meet their obligations fully, even on the basis of schedules set up just prior to third quarter and those who have set up quotas for fourth quarter are already confronted by prospect of revising them, though at the moment they have no idea how much will be necessary.

## Tin Plate . . .

Tin Plate Prices, Page 139

**Pittsburgh** — Possibility of relaxing some conservation measures embodied in Order M-43 was reviewed by the Tin Plate Industry Advisory Committee when it met in Washington late last week. Extent of the export directive for fourth quarter will have an important bearing on final decision. Third quarter export directive totals 112,000 tons, and it remains to be seen whether previous estimate of 56,000 tons for the final three months this year will be altered. Supply of railroad box cars is becoming more critical, although tin plate operations have not yet been adversely affected.

Producers have not yet opened books on 1947 tin plate contracts. At this time it is uncertain what prices will prevail on these contracts. Much is dependent upon the level of pig tin prices late this year and additional price relief, if any, granted by OPA. It will be recalled that $5 average price advance granted the steel industry earlier this year could not be applied to tin plate because of contract commitments with can manufacturers who in turn had commitments with packers.

**Chicago** — For the moment, at least, adequate number of box cars are available to move tin plate production, but the situation varies from week to week and there is fear that shortages will develop frequently between now and fall. Tin plate capacity is filled for the balance of this year, and whether reimposition of the general priority system Oct. 1 will have any upsetting influence on scheduling for last quarter is not yet known.

## Steel Bars . . .

*Pressure for small bars insistent, with mills sold through year; some mills refuse further orders*

Bar Prices, Page 138

**New York** — Pressure for small carbon bars is increasing, but with producers unable to gain much headway against commitments and still refusing to open books for 1947 delivery. As matters now stand bar mills generally have nothing to offer for this year in any size of hot carbon bars or very much in cold-drawn carbon bars. Only some tonnage in the larger ranges of cold-drawn carbon bars can be had and that for delivery no sooner than December. Hot alloy bars, on the other hand, are easily available for September delivery, in practically all sizes.

**St. Louis** — Barmakers have stopped taking orders and are gaining ground on backlogs for the first time in months. Pressure for shipment continues to increase, but a diminishing of new demand is noted. On identified projects such as bridges mills will accept limited orders for February or March shipment. Manufacturers' orders are being rejected. The cutoff occurred two weeks ago when mills found themselves booked through next year on some products. Production has been improving but some raw material shortages are being encountered now, especially in old rails. Deliveries are picking up, running 4 to 6 weeks late, compared to 6 to 8 weeks a month ago.

**Philadelphia** — Dearth of hot carbon bars continues, especially in smaller sizes, 1½-inch and under. Producers are far behind on current commitments, with no capacity available for new business for the remainder of the year and no tonnage being accepted for next year. Cold-drawn bars are almost as scarce, although some larger sizes can still be placed for late December. Alloy bar shipments, however, are comparatively easy, with hot bars available for September.

**Cleveland** — Operations at carbon bar mills continue to rise gradually as available steel increases. There is practically no change in the heavy order backlog; books for this year have been filled for several weeks and 1947 books will not be opened until late next month or early in fourth quarter. Some space is still open in fourth quarter for cold-drawn and alloy bars.

## Steel Plates . . .

*Slow deliveries handicap fabricators as mills are months behind, with new tonnage taken selectively*

Plate Prices, Page 139

**New York** — Tank fabricators are booked months ahead and are well behind because of inability to obtain steel on schedule. Some fabricators report that plate shipments are behind two to three months and in a few scattered instances even further. The major portion of business on hand is for commercial consumers. Considerable public work has been figured, but an appreciable amount of it has not gone ahead because estimates have exceeded appropriations.

Tank fabrication and other miscellaneous requirements continue to exert considerable pressure on local sellers notwithstanding the fact that ship needs are still declining. Indicative of the downward trend in shipbuilding is a government study here, which points to a decline to 30,000 men in local yards by November, from more than 60,000 last March and 130,000 at the peak of wartime activity.

While some plate producers are booking first quarter tonnage, they are moving cautiously. Consequently little new tonnage is being entered, with attention being directed principally to movement of tonnage already on order.

**Seattle** — Plates are in good demand, several large projects being up for bids. Shops have many small jobs which will carry to the end of the year. Difficulty in obtaining mill shipments is the principal obstacle. Paul Jarvis Inc., Seattle, has a contract at $80,587 for a 78-inch diameter steel penstock for Seattle's Cedar river water system. United States engineer at Portland, Oreg., rejected a bid of $74,550 for 70 steel pontoons and took new bids Aug. 7.

**Birmingham**—Plate output has hit the highest rate since the coal strike, in line with steel production generally, but still is not in sufficient quantity to meet demand, even in the face of some easing of pressure for delivery. Mills are booked until the end of the year, at least, and there is slight prospect of early and permanent improvement in the overall situation.

**Philadelphia** — District plate producers, because of short supply of pig iron and scrap, continue to fall behind in production. Output, already seriously curtailed at some plants, is scheduled to decline still further this week. As a result arrearages are increasing, with one producer now more than four months behind. Inability to maintain schedules is causing producers to move more cautiously in accepting new tonnage for shipment next year. Some plate sellers have not opened books for first quarter but others have accepted a limited tonnage for some weeks. Frank R. Curtis is low on the general contract for supplying and installing 700 tons of fabricated steel pipe, 42 and 48 inches in diameter for Philadelphia.

## Structural Shapes . . .

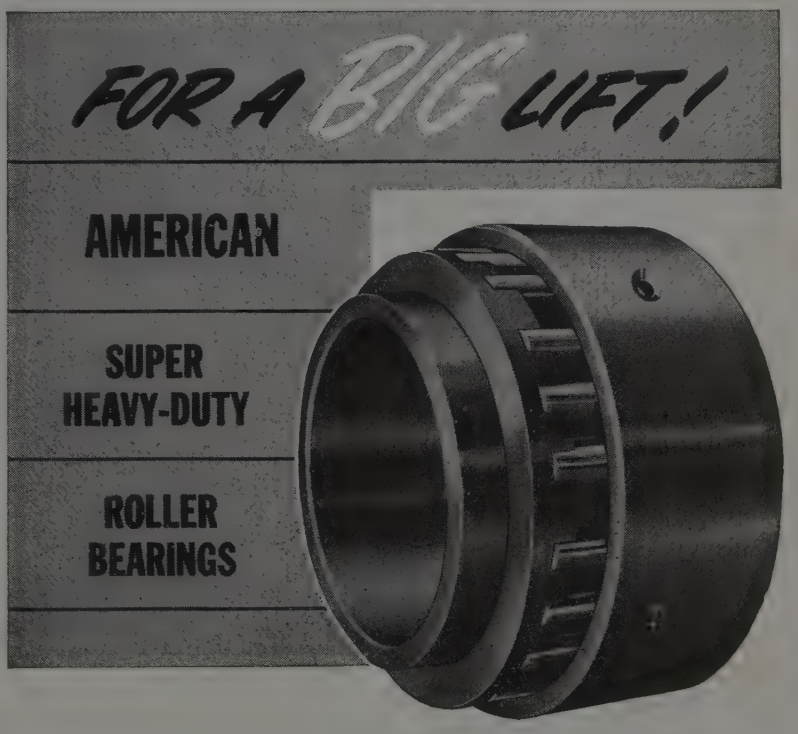
Structural Shapes Prices, Page 139

**New York** — P. T. Cox Construction Co. Inc. is low on the general contract for constructing a section of the west side elevated highway, involving 4500 tons of structural steel and additional quantities of piling and reinforcing. Bids have been rejected on two state bridges to be erected on the Wilbur Cross Parkway, near Hartford, Conn., involving a total of 1000 tons of shapes.

**Boston** — Most tonnage for 40 Maine Turnpike bridges, about 4000 tons, will be fabricated by American Bridge Co. Although most heavy construction projects are from two to three months behind schedule, inquiry holds up surprisingly well. This is not entirely or primarily due to delays in fabricated steel, but frequently shortages in other materials, delays in detailing, plans and other factors. Structural mills are rolling at a high rate, but are making slight dent in backlogs with deliveries well into first quarter and in some cases beyond.

**Birmingham** — Shape output is in good volume and pressure has eased somewhat, due to refusal of CPA to approve certain pending projects. Fabricators, however, are short on shapes and are well booked through the year.

**Seattle** — Fabricators have full schedules, mainly small jobs, which constitute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a good backlog. Mill shipments are insufficient to meet demand and shops are handicapped by lack of steel.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 139

**New York** — Two contracts involving 6700 tons feature the reinforcing steel market. Both contracts went to Bethlehem Steel Co., with 3500 tons for the Brooklyn-Queens connecting highway, Contract No. 4, placed through Del Balso Construction Corp., New York, and 3200 tons for a section of the Manhattan approach to the Brooklyn-Battery tunnel, awarded through Gull Construction Co. Inc., and L. G. De Felice & Son, New York. The Brooklyn-Queens highway job also required 3500 tons of H-piling and the tunnel approach 1000 tons of H-piling, both contracts for which also went to Bethlehem Steel Co., in addition to some structural work previously reported. Approximately 2000 tons of bars also are required for the Abraham Lincoln housing project, this city, in addition to 5500 tons of structurals. H. R. H. Construction Corp., general contractor, was low on the project, with a bid of $7,292,000.

**Boston** — With approximately 6000 tons of concrete reinforcing bars up for placement only a fraction of this volume is available. Distributors have small inventories and show slight interest in tonnage lots. Production has been light for months and an export directive for 15,000 tons has not helped the supply outlook. Heavy demand for merchant bars in small sizes and the low profit margin in reinforcing keeps down output. Contractors seeking to place orders are stymied and considerable construction is threatened with delay. Largest inquiries are: 2350 tons for Maine bridges, and 1250 for the Nut Island sewage plant at Quincy, Mass.

**Seattle** — Washington state will receive bids Aug. 13 for road work in Stevens and Pend Oreille counties, including reinforced culvert and girder bridge, requiring 260 tons of reinforcing steel and eight tons of shapes. Bureau of public roads, Portland, Oreg., has called bids for Aug. 20 for work in Mt. Hood National Forest, calling for 108 tons of alloy shapes, 85 tons plain shapes and 27½ tons of reinforcing steel.

**Chicago** — Demand for reinforcing steel has fallen the past few days as the overall situation grows tighter. Large construction jobs apparently are being held back by the CPA approval system although critical shortages of building materials also is exerting an influence. Reinforcing bar suppliers report inquiries for tonnages ranging from a few up to 100 tons are numerous but steel is inadequate to accommodate them all.

## Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 139

**New York** — Increasingly acute shortage of nuts, especially in smaller diameters, is noted. Bolt and nut makers have been selling small bolts, with the advice to buyers that they try to pick up the necessary nuts out of warehouse. This has been done quite extensively but the point has now been reached where warehouses are well cleaned out on these smaller sizes and the situation in general is described as being exceedingly tight.

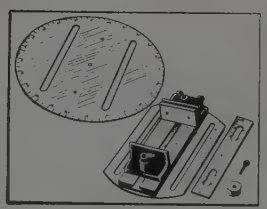
The major difficulty is that strikes are still going on at plants of some larger producers of nuts. Moreover, one especially large nut maker which before the war turned out a heavy production from coil steel, has not as yet resumed manufacture of small nuts and there is no early indication that he will.

Indicative of scarcity in small nuts, various sellers now have nothing to offer under six months, but can do somewhat better in small bolts, say, ½-inch and smaller. Deliveries on small bolts appear to average around 12 to 20 weeks, far more extended than normally. These small items are in special demand for the manufacture and assembly of parts. Deliveries on structural bolts, ¾ and ⅞-inch also are extended, due to shortage of wire rods. On the general run of larger bolts shipment within six to eight weeks can be promised in various cases.

In addition to domestic demand for small bolts, there is heavy inquiry from abroad, especially from the Far East and South America, particularly from Brazil. Current at present are 385 tons of small bolts for India. The Philippines, Cuba and Siam have numerous inquiries before the trade.

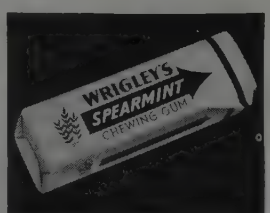
Bethlehem Steel Co. has established Lebanon, Pa., as a basing point on track bolts and large rivets 1½ inches and larger. Thus, untreated track bolts

**New, Simplified Drill Press Vise, Speeds Up Drilling, Spacing, Milling**



**Designed to be used** with a drill press table having either parallel or radial slots, the New UNI-VISE drill press vise, with guide bar and protractor disc, speeds up and simplifies drilling, layout and spacing work in straight lines, radial or circular. With two movable jaws, vise has universal movement without swinging table or head of drill press to locate exact position of work. Operator thus adjusts work quickly for accurate registration.

**Guide Bar** facilitates drilling holes in a straight line. With a straight edge and a lineal scale on surface, it registers with lineal scale of vise. Protractor disc, for drilling holes accurately in a circle, has parallel slots registering with parallel slots in base of vise, and a removable means to pivot complete unit on table of drill press.

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are now being quoted at 6.25c, f.o.b. Lebanon, and treated bolts at 6.75c. Rivets, ½-inch and larger, are being quoted at 4.90c, f.o.b. Lebanon. The new prices were effective Aug. 6.

## Wire . . .

Wire Prices, Page 139

**Boston**—Wire mill production is below anticipated levels in most instances, limited rod supply retarding output. Most users of wire are short of material and are pressing for overdue orders. Production schedules are subject to constant revision; inquiry is heavy and a substantial volume finds no place on mill books. Relatively few outside rod producers are selling in this territory on the Worcester base, although one Pittsburgh mill has sent in a few cars unexpectedly, semifinished having backed up, due to lagging finishing production.

While licenses are being granted on cut nails for export, no shipments are permitted until after Sept. 30, it is understood.

**New York** — Wire sellers continue to be confronted by heavy demand for virtually all products, except wire rope and a few other scattered items. While wire operations have not yet been materially affected by the shortage of pig iron and scrap, producers are greatly concerned as they are already far behind on current commitments and their stocks of steelmaking materials are low. Shortage of copper and zinc remains pronounced and consequently is creating production difficulties in some lines. Inasmuch as they have not opened books for next year and their operating schedules are more than jammed for the remainder of this year, sales offices are devoting attention mainly to expediting current commitments.

**Birmingham** — Wire products continue short. Especially up in arms is the Southern Peanut Association, which charges that the $65-million Alabama, Georgia, and Florida crop is in jeopardy due to a shortage of nails for stack poles on which to cure the crop. Wire fencing and drawn wire are comparatively short and demand is insistent.

## Tubular Goods . . .

Tubular Goods Prices, Page 139

**Pittsburgh** — Output of nonintegrated pipe plants, although showing some improvement recently, continues to be retarded by limited production of tube rounds and skelp. Most of these continue to be absorbed in integrated mill operations, as unfavorable price relationship restricts distribution of semifinished. Exceptionally heavy demand is expected to keep jobbers' inventories of steel pipe and oil country goods well below normal throughout this year. A plastic dip coating process is now being used on steel tubular goods at the Ellwood City plant of National Tube Co. It also has been revealed recently that this plant will be closed and its operations transferred to Gary, Ind., within three years.

Due to shortage of pig iron, cast iron pipe producers have fallen well behind on projected delivery schedules, with most interests booked into 1947. Indicative of this situation, many municipal projects are being postponed 2 to 3 months. Soil pipe producers are expected to obtain substantial relief under the CPA certified tonnage directive program.

**Boston** — Electric welded tubing production is sold well beyond fourth quarter and consumers are sounding out mills on prospective tonnage for next year. Some users of butt-weld lightwall tubing shifted to electric weld or seamless requiring equipment changes in fabricating and are uncertain as to specifications in the near future. Backlog in pressure tubing amounts to a year's production with some producers. No delivery promises are made on new orders for merchant steel pipe; producers average about three months behind on quota deliveries and jobber stocks are small, three-inch and under especially. Beyond quota requirements of distributors, pipe mills are slow to take on new large inquiries and if accepted delivery is left in the air; Boston Consolidated Edison Co. has an inquiry out for approximately 1050 tons of 24-inch steel pipe.

**Cleveland** — Production of pipe has shown steady improvement during the last few weeks, permitting producers to establish September quotas at 100 per cent of August quota. It is hoped that backlog can be cut substantially during the next seven weeks and possibly elim-

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inated entirely by the end of October. Due to a return to normal bessemer steel shipments to pipe mills, production of butt-weld pipe is close to capacity and that of electric weld at the highest rate possible, based on the finishing capacity of mills. Only a few certified orders were received for September delivery.

**Seattle** — Cast iron pipe sellers report 13 months is the best delivery that can be offered. Buyers are placing orders for 1947 delivery to obtain priority on books. Pending business includes 1000 tons at Kelso, Wash., and 200 tons at Pasco, Wash.

## Pig Iron . . .

*Preference tonnage takes large share, other users being limited; foundry inventories low*

Pig Iron Prices, Page 141

**Pittsburgh** — Plans for bringing high-cost blast furnace units back into operation under a subsidy arrangement are again being considered with resumption of OPA. Unless this program rapidly materializes no significant relief from present critical pig iron shortage is indicated for this year. It will take some time to put these units into operation even should a favorable subsidy arrangement soon be agreed upon. Most foundries have less than two weeks' pig iron supply and coke stocks are not in much better shape. Shortage of cast scrap is another factor expected to retard foundry operations. Because of the pig iron scarcity Wheeling Steel Corp.'s steel works, blooming mill and skelp mill at Benwood, W. Va., were idle last week.

Many foundries, not coming within the scope of the CPA directive program to expedite shipments of pig iron for the farm implement and housing requirements, are expected to be hard hit during August and September in respect to adequate iron supply. Certified tonnage alone will approximate 50 per cent of the merchant producer's output here. The important factor in this situation is that certified tonnage shipments will be channeled to only 10 per cent of the producer's customers. Foundry interests in the South will be particularly hard pressed meeting production schedules, as stated certified tonnage requirements, notably for soil pipe, are said to represent about 120 per cent of the current merchant pig iron production in that area. There is some prospect that the CPA directive on pig iron may be revoked, due to acute hardship forced on many foundries not coming within the privileged classifications.

**New York** — Pig iron is moving somewhat more freely, but most consumers have been unable to build up backlogs to any extent and in various instances continue to operate on a curtailed basis. The melt here was down in July and there is some question of appreciable improvement this month. However, the odds seem to favor some increase, especially in view of the fact that the summer vacation season has already been observed by most plants and that op-

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erators will run plants to the limit of raw material supply.

**Boston** — Less iron will be available for delivery to New England during the balance of this quarter and shipping schedules are being revised downward accordingly. Although not notably heavy in this area, overall certified tonnage for delivery the next two months is larger than anticipated; distribution to foundries, already thin, will be further reduced. Several producers have notified consumers they will ship no iron; several groups, including textile mill machinery shops, are appealing to Washington for aid. Meanwhile the foundry industry is losing inventory rapidly and steel works are barely maintaining operations with supply on hand-to-mouth basis.

**Cincinnati** — Shipments of pig iron, to the extent of commitments, were prompt in July but the August and September outlook, especially in southern iron, is clouded by the extent of priority tonnage. Only a small percentage of the melt in this district is eligible for these certified orders.

**Philadelphia** — Foundries not engaged in production of castings classified as critical for housing and agriculture are being further squeezed on pig iron and most have to curtail. Some not already down are faced by early suspension. Strong appeals are being made to Washington, but with little effect. Manufacturers of certain types of stoves not classified as essential to the housing program, for some reason not clear to them, are pressing particlarly hard. However, it appears that those on the preference basis may not get all the iron originally indicated for this quarter and the entire situation is said to be under further survey. Reductions may be forced to provide some relief in hardship cases behind the certified circle.

Meantime basic consumers are hard hit by shortage of iron and scrap, although blowing in of the Birdsboro, Pa., stack, scheduled for Aug. 15, will bring some relief.

**Birmingham** — Merchant iron sources estimate the current supply of iron at not less than 50 per cent short of demand. Stove manufacturers, foundries and iron users generally are protesting CPA action in certification of approximately 100 per cent of southern iron while northern interests, they contend, can dispose of 70 per cent or more of their iron as they please. The situation has resulted in considerable confusion.

## Warehouse . . .

**Warehouse Prices, Page 140**

**New York** — Incoming mill shipments have slowed somewhat recently, with a result that district steel distributors are a little less confident of an increase in August business than at the beginning of the month. There is continued strong demand for most products, especially small bars and shapes and light flat products, but actual warehouse bookings are limited by the volume of steel received from mills. If mill receipts fail to exceed shipments for July there will certainly be no gain in business for this month, jobbers declare. However, it is still too early to draw any definite conclusions as to the outlook for August.

**St. Louis** — Warehouse steel inventories continue to shrink and are approaching a record low. Shipments exceed receipts consistently and size assortments are bad. An improvement anticipated for August has not materialized because scrap and railroad car shortages are crippling warehouses' suppliers. Demand is unremitting, particularly for sheets and bars. Far more orders are being rejected than filled.

**Seattle** — Warehouse demand continues brisk, greater than can be filled. Mill shipments have improved but some items, notably galvanized sheets and nails, continue tight. Reinstatement of OPA has not affected the trade here as ceiling prices were generally observed during the interim.

**Boston** — Warehouses are getting more steel in wanted sizes and grades, but inventories are not building; against back orders and shipping notices, most material goes direct to consumers without being racked. Steel now reaching distributors in better volume is months overdue in some cases. Alloy stocks are generally in balance with demand relatively slower than for carbon products. Galvanized sheet quotas to jobbers this quarter will be lower due to certified orders on mills under Direction 12.

**Cincinnati** — Warehouses maintain good volume despite serious shortage in wanted items. Inventories show little improvement. Structurals are virtually not obtainable. Some sheet wasters are


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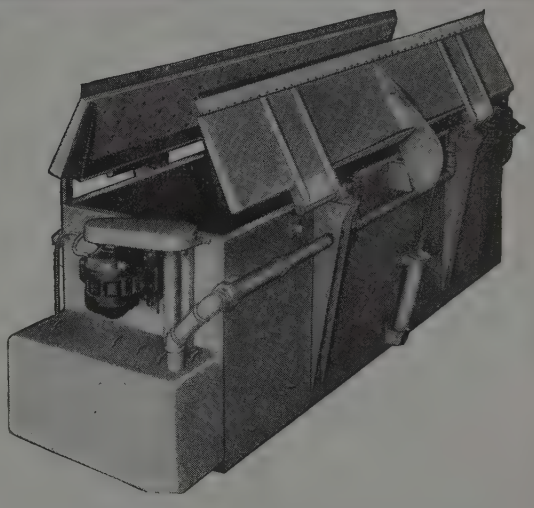

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coming out and are taken avidly. Demand for large rounds is duller.

**Pittsburgh**—Warehouse interests hope to be able to supply a larger portion of customers' stated requirements this month as result of the recent slight improvement in mill shipments. Distributors' stocks of galvanized sheets, hot and cold-rolled sheets in light gages, wide flange beams and small bar shapes remain well below even essential customers' needs. Although some improvement in the stock position of these items has occurred there is little possibility that inventories will be adequate through the remainder of this year. Some warehouse customers continue to operate well below capacity, due to critical shortage of many steel items.

**Chicago** — Steel warehouses find demand undiminished and of such volume that it cannot be fully satisfied. Customers report difficulty in getting steel from mills to be even more aggravated than during the war. With reimposition of the general priority system Oct. 1, smaller consumers have hope of better treatment and this may be reflected in warehouse demand.

**Philadelphia** — Jobbers report decline in mill shipments recently and therefore are less confident of an increase in August sales. However, they point out that it is too early to draw definite conclusions.

## Coke By-Products . . .

Coke By-Product Prices, Page 139

**New York** — Prices on sulphate of ammonia, naphthalene flakes and phenol have been advanced recently and discussions under way which may lead to early increases in benzol, toluol, solvent naphtha and industrial xylol. Demand for all products is described as active, costs having advanced sharply over recent months.

## Channel Carbon Black Base Prices Advance ½-Cent

Godfrey L. Cabot Inc. increased its prices effective Aug. 7, ½-cent a pound on all grades of ordinary carbon black made by the channel process. This firm is one of the largest manufacturers of channel carbon black. Office of Price Administration lifted price controls from ordinary channel black and premium channel black selling for six cents or less at the manufacturers level, effective as of Aug. 2.

## Higher Prices Posted on Track Bolts, Large Rivets

Track bolt and large rivet manufacturers increased prices last week, following the lead taken by two manufacturers late last month. The new base price for track bolts is 6.50c per pound and for heat-treated track bolts 6.75c. Base price for large rivets, 1/-inch and larger, has been increased to the basis of 4.75c with the original list of extras now applying.

## Scrap . . .

### *Continued shortage threat to steel production as OPA price refusal fails to bring out tonnage*

Scrap Prices, Page 142

**Pittsburgh** — Restoration of OPA has failed to pry loose any additional scrap tonnage to date, with consumers drawing heavily on inventories and using a larger proportion of pig iron in open-hearth operations. Mill production has not yet been curtailed by scrap shortage but unless the movement of scrap to consuming points shows marked improvement within the next two weeks present output cannot be sustained. This district is somewhat better off than others in respect to scrap supplies. One interest has transferred considerable scrap tonnage to Chicago to relieve a critical shortage there.

With resumption of OPA many rejections of upgraded shipments have developed. During the free market period through most of July, considerable tonnage of No. 2 heavy melting steel was accepted as low phos material. Although requests for higher scrap prices have been flatly refused by OPA, many interests continue to hold scrap with the hope that higher prices eventually will have to be established.

Government's program for scrapping 280 ships is expected to yield about 700,000 tons, but consumers do not believe this program will relieve the present critical shortage in time to prevent a downward revision in production. More than 2 million tons of scrap must be obtained to sustain steel industry's ingot production at present nearly 90 per cent level over the next 12 months, according to CPA.

**Philadelphia** — Scrap shortage is more acute than at any time during the war, with no early improvement in early prospect. Scrap sellers generally believe they are entitled to higher prices, with the ceiling for melting steel, for instance, unchanged in several years. Collections are difficult and despite reports from Washington that there will be no change they still look for higher prices. Meanwhile, so urgent is the need that bartering is increasing greatly, involving much cross hauling and uneconomical operation.

**Boston** — District sales forces are being solicited by some steelworks to contact customers for steel scrap and in scattered instances are unearthing car lots. Supply of heavy melting and cast grades is slim, although some tonnage is still withheld and yard inventories vary in size. One Boston district yard has a substantial inventory of turnings, although production of industrial scrap is lagging. Several consumers of cast have increased reserves, over-ceiling metal bought during the OPA recess; it now appears as high as $35 was paid during that period.

**Buffalo** — Mill consumers made deeper inroads into shrinking reserve stocks as dealers admitted holding back scrap in anticipation of higher prices. Concern spread as mills drew within days of cutting operations as stockpiles dwindled at

a time when 150,000 tons are usually being accumulated for next winter's use. The question in the trade is whether higher prices would bring any appreciable increase in the movement of scrap. While some dealers believe supplies would expand, others contend that the scrap is not available, regardless of price. Water movement from the upper lakes and eastern seaboard is far short of the volume a year ago. Pittsburgh buyers are said to be active in eastern supply centers which usually sell to local mills because of the intrastate movement and shorter freight run. The interstate and additional charges, however, are absorbed by the Pennsylvania buyers, who also hold advantages over local mills because of higher ceilings.

**Cincinnati**—Effect of OPA announcement that ceilings on iron and steel scrap will not be increased has not yet been noted in this district, although eventually some hoarded tonnage may be brought out. Supplies appear tighter as mills eagerly seek tonnage so they may conserve present stocks against winter conditions. Many foundries are on a hand-to-mouth basis.

**St. Louis** — Scrap shipments continue low. Brokers are convinced there will be no increase until there is a price rise and hold little hope for that. They believe dealers at collection points will hold out almost indefinitely for a break in ceilings. As a result steel mills here are eating into inventories, most of which are under 30 days. Until three weeks ago reserves had been exceptionally good, due to a long shutdown of the area's largest scrap user. Foundries are desperate for scrap, many reporting only three or four days' supplies. All prices remain at ceilings.

**Birmingham** — Scrap is a major problem. As matters stand now, virtually no tonnage is moving, although OPA ceilings continue to be offered. It was anticipated generally that the shortage would have been reflected in steel production by now, but thus far this has been successfully avoided.

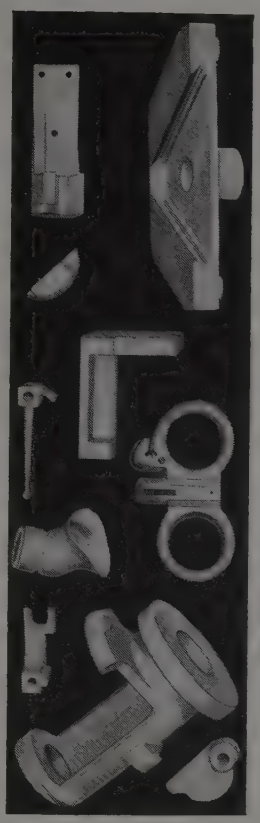
**Seattle** — Steel scrap supply is still a problem, although OPA statement no increase will be granted has eased the situation slightly. Mills are not receiving as much material as they need and inventories are not being increased. This situation is expected to improve soon, as more material comes out of hiding. The ceiling on heavy melting steel is $14.50 per gross ton, fob mill. Practically all shipyard scrap has been moved, though some small tonnages continue to come out as dismantling continues. Buyers are falling back on prewar sources of supply.

## Nonferrous Metals . . .

Nonferrous Prices, Page 143

**New York** — Government has resumed purchases of foreign copper, lead and zinc on the basis prevailing before the expiration of the former price control law, June 30. This buying program was initiated in 1942, under which the Metals Reserve Corp. buys foreign ores and concentrates and resells them on a basis low enough to permit refineries to operate within OPA ceilings.

Although demand is heavy, shortage of copper does not appear quite as pronounced as recently, not only because

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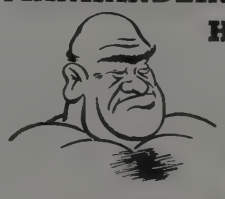

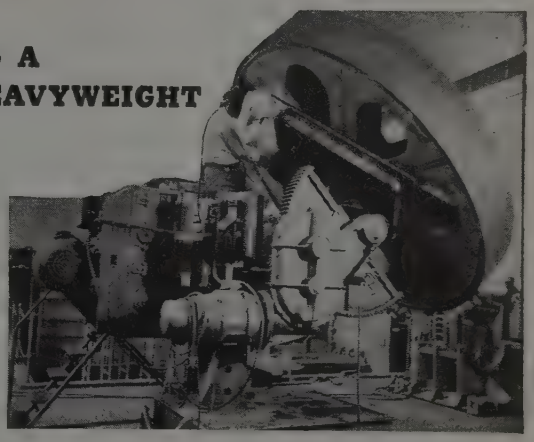

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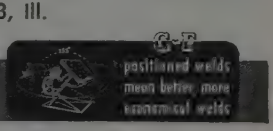

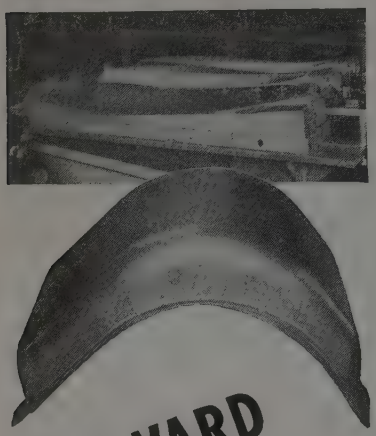

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of resumption of government buying abroad, but because of increased domestic production. Encouraging are advices that the strike in the large Rhodesian copper mines has been settled, with early resumption of work scheduled.

Lead is being tightly held, with some question as to whether sales for delivery this month will be as heavy as in July, when the total was approximately 33,000 tons. Purchases of foreign lead by the government for third quarter may amount to about 24,000 tons, with the price 9.50c, fas Gulf ports. Such metal apparently would be resold in the domestic market at the equivalent of 8.25c, New York.

Demand for zinc is still well in excess of offerings. There is still dissatisfaction over the prevailing price ceiling of 8.25c, East St. Louis, and various sales have been reported recently as having been made on the basis of price prevailing at time of shipment.

## Iron Ore . . .

**Iron Ore Prices, Page 140**

Iron ore loadings in the Lake Superior district in July totaled 10,848,385 gross tons, compared with 11,372,282 tons in July, 1945, a loss of 523,897 tons, 4.61 per cent, according to the Lake Superior Iron Ore Association, Cleveland. Details of shipments from various ports are as follows:

| | July, 1946 | July, 1945 |
|---|---|---|
| Escanaba | 565,240 | 687,421 |
| Marquette | 521,322 | 521,624 |
| Ashland | 680,775 | 634,583 |
| Superior | 3,857,298 | 3,615,997 |
| Duluth | 2,687,458 | 3,072,229 |
| Two Harbors | 2,322,803 | 2,764,550 |
| Total, U. S. Ports | 10,634,896 | 11,296,404 |
| Michipicoten | 58,561 | 61,900 |
| Port Arthur | 154,928 | 13,978 |
| Total, Canada | 213,489 | 75,878 |
| Grand total | 10,848,385 | 11,372,282 |

Decrease from year ago 523,897 tons, 4.61 per cent.

For the season to Aug. 1 shipments totaled 23,848,839 tons, compared with 40,396,868 tons in the comparable period last year, a decrease of 16,548,029 tons, 40.96 per cent. Details follow:

| | To Aug. 1, 1946 | To Aug. 1, 1945 |
|---|---|---|
| Escanaba | 1,142,925 | 2,570,575 |
| Marquette | 985,050 | 1,986,220 |
| Ashland | 1,515,783 | 2,391,817 |
| Superior | 7,160,952 | 12,793,968 |
| Duluth | 6,689,579 | 10,648,405 |
| Two Habors | 5,874,702 | 9,775,041 |
| Total, U. S. Ports | 23,368,991 | 40,148,036 |
| Michipicoten | 225,501 | 234,854 |
| Port Arthur | 254,347 | 13,978 |
| Total, Canada | 479,848 | 248,832 |
| Grand total | 23,848,839 | 40,396,868 |

Decrease from year ago, 15,548,029 tons, 40.96 per cent. . .

Normal midseason point in the navigation period is early in August, the tonnage to Aug. 1 indicating a season movement of about 50 million tons. However, additional ships are in the ore trade for the remainder of the season and the total may be larger than now indicated, reaching perhaps 55 to 60 million tons. Six ships of the War Shipping Administration have entered the ore trade and will increase August movement.

## Canada . . .

**Toronto** — With the strike shutting off practically all iron and steel deliveries, there has been general slowing in interest on the part of consumers. It is pointed out that the steel strike, even if settled immediately, will result in at least a 50 per cent loss in iron and steel production for this quarter, and that orders previously booked for third quarter delivery exceeded normal production for the three month period, thus there is little prospect of mills handling more business this year than they already have on books. With the uncertainty regarding delivery buyers appear in no hurry to place additional tonnage and business as a whole has fallen into a general slump. This condition, however, does not mean that consuming interests do not want iron and steel; on the contrary the demand has reached such proportions that it will take well into 1947 before there is any prospect of demand and supply equalizing.

## Farm Machinery Production Drops 3.1 Per Cent in June

Production of farm equipment dropped to $56,637,625 in June from $58,469,486 in May, a decline of 3.1 per cent, the Civilian Production Administration reported recently in a survey of farm machinery production covering the last two years.

The June drop largely reflected the cumulative effect of the continued labor-management disputes at the J. I. Case Co. and the Allis-Chalmers Mfg. Co., together with shortages of components. However, production for July and subsequent months is expected to be bolstered by CPA's certification program which provides priorities on steel and iron castings for farm machinery.

The survey disclosed that exports to all countries, including Canada, dropped to 9.8 per cent of total production for the year ended June 30, 1946, from 12.2 per cent in the previous 12 months' period. Exports totaled $62,674,575 in the year ended June 30 compared with $80,934,-154 in the preceding fiscal year.

Production of new machinery gained 3.6 per cent in the 1946 fiscal year over the previous year, although overall production (including repair parts) showed a 3.7 per cent drop below the 1945 level.

## Nation's Electric Capacity Seen Raised 30% by 1950

America's electric power industry, expanding at an unpredented rate, will probably have a 30 per cent greater generating capacity by 1950, according to Gwilym A. Price, president, Westinghouse Electric Corp., Pittsburgh. Mr. Price estimated that sales of central sta-

tion equipment will represent 27 per cent of Westinghouse's total business in 1946. In 1944 equipment of this nature represented less than 2 per cent of the company's one billion dollar production, Mr. Price explained.

Indicative of the large-scale programs of the utilities, Mr. Price pointed out, is the fact that more than 55 utilities have placed orders with Westinghouse in excess of half a million dollars each. Some of these orders are for delivery in 1949.

"Since this condition is general throughout the heavy electrical equipment industry," Mr. Price said, "It appears that the central station equipment manufacturers of the nation will be at peak production at least until well into 1949."

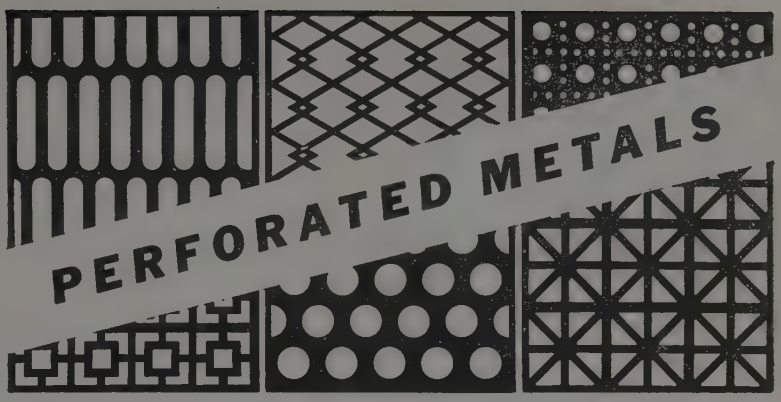
Installed generating capacity in this country is 51,200,000 kilowatts compared to 44 million in 1941, and the estimated total for 1950 is between 65,700,000 and 67,500,000. On a per capita basis, today's production of electricity in the United States is eight times that of the rest of the world, Mr. Price added.

## Aircraft Industry To Back National Show at Cleveland

First National Aircraft Show, sponsored by the Aircraft Industries Association, will be held Nov. 15-24 at Cleveland Municipal Airport, with the indoor section housed in the 50-acre Fisher aircraft assembly plant, leased for the occasion from the War Assets Administration. The enormous plant, adjoining the airport, provides 2,270,000 sq ft of floor space and has 300-ft wide hangar doors, ample to admit such large planes as the Consolidated B-36 10,000-mile range bomber, and the Northrop Flying Wing.

The second or West Coast edition of the National Aircraft Show will be staged in Los Angeles next April, it being the intent of the show sponsors to schedule two each year, one in the East or Middle West and the other on the Pacific Coast. The military flying services will be prominent participants in both shows. Some 500 members of the Aircraft Industries Association, dealers, distributors and firms allied with the aviation industry, are expected to be numbered among exhibitors.

Director of the National Aircraft Shows is Clyde M. Vandeburg, formerly manager of the Aircraft War Production Council-East Coast; co-organizer and deputy director of the Office of War Information; at one time public relations director of Packard Motor Car Co., and having extensive experience in management of expositions.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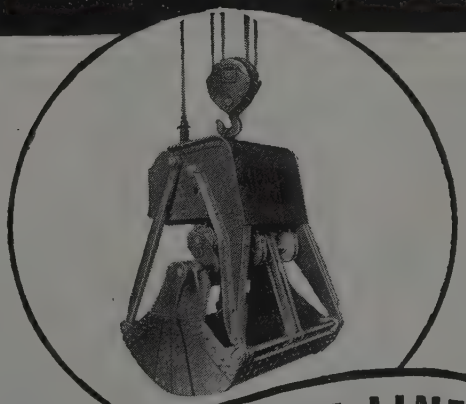

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## Federal Products To Hold Quality Control Meetings

The first of a series of two conferences on quality control and allied topics will be held at the Providence, R. I., plant of Federal Products Corp. Aug. 13-16. A second conference is planned for Sept. 10-13. Specific purpose of the August conference is to demonstrate under actual factory conditions how quality control, statistical methods, gaging and inspection can be applied economically to plant operations. An important part of the program will be devoted to gage design.

Members of the sales engineering staffs of Pratt & Whitney Co., Hartford, Conn., and Taft-Pierce Mfg. Co., Woonsocket, R. I., will collaborate in the program with the following experts: R. A. Cotter, quality control engineer, U. S. Time Inc., Waterbury, Conn.; W R. Purcell, quality control manager, Sylvania Electric Products, Salem, Mass.; C. J. Hudson, quality manager, Norton Co., Worcester, Mass.; John Greacen, chief inspector, Bristol Co., Waterbury, Conn.; C. J. Kirchen, statistician, Remington Arms Co., Bridgeport, Conn.; Fred Stone, director of engineering, Wanskuck Mills, Providence; and Dr. J. M. Juran, Wallace, Clark Co. and New York University, New York.

## OPA Reinstates Industry Advisory Committees

All OPA industry advisory committees which were set up under the authority of the Price Control Act and which were in existence on June 30 have been automatically reinstated under terms of legislation extending price control. This means that 685 industry advisory committees will continue to advise and consult with the price administrator on matters pertaining to their industries.

## AFA Committee Chairmen Meet To Formulate Plans

National and chapter officers of the American Foundrymen's Association met in Chicago recently to discuss the association's aims and programs for the coming year. Under discussion at this third annual committee chairmen's conference were such subjects as apprentice work, educational courses, vocational guidance, community relations, and closer co-operation with engineering schools and societies.

Chairman of the conference was Max Kuniansky, vice president of the AFA and vice president, Lynchburg Foundry Co., Lynchburg, Va. F. J. Wall, past president of AFA, welcomed the delegates and reviewed the history of the organization. Sheldon V. Wood, association president and 1945-46 membership committee chairman, outlined the growth of the organization over the past several years and revealed that its membership had more than doubled since 1941 and on June 30 was at a new high of 8539 companies and individuals.

## STRUCTURAL SHAPES . . .

### STRUCTURAL STEEL PLACED

10,000 tons, expansion to strip mill, Indiana Harbor, Ind., for Inland Steel Co., to Bethlehem Steel Co., Bethlehem, Pa.

3500 tons, H-piling, Brooklyn-Queens connecting highway, Contract No. 4, New York, through Del Balso Construction Corp., that city, to Bethlehem Steel Co., Bethlehem, Pa., which also booked 3500 tons of reinforcing steel for the same project and, as noted in a previous issue, 350 tons of shapes.

1000 tons, H-piling, section of Manhattan approach to the Brooklyn-Battery tunnel, New York, through Gull Construction Co. Inc., and L. G. DeFelice & Son, to Bethlehem Steel Co., Bethlehem, Pa., which also booked 3200 tons of reinforcing steel, and as noted in a previous issue, 1050 tons of shapes.

650 tons, 80-foot highway truss spans, for Mexico, to Virginia Bridge Co., Roanoke, Va.

300 tons, state bridge Snake river, Idaho, to Bethlehem Pacific Coast Steel Co., Seattle; Hansen Bros., Spokane, contractors.

260 tons, two bridges for the Reading Co. near Clement, Pa., to American Bridge Co., Pittsburgh.

130 tons, manufacturing building, Chicago, for Sam Cassell Co., to Joseph T. Ryerson & Son Inc., Chicago; Poirot Construction Co., Chicago, contractor; bids June 3.

### STRUCTURAL STEEL PENDING

2200 tons, box factory, Pensacola, Fla., for Alabama Pulp & Paper Co.

2000 tons, office building, Mobile, Ala., for Waterman Steamship Co.

1700 tons, power plant extension, Brilliant, O., for Ohio Power Co.

1000 tons, two state bridges, Wilbur Cross Parkway, Hartford, Conn., American Bridge Co., Pittsburgh, low bidder.

500 tons, cracking tower, Robinson, Ill., for Ohio Oil Co.

200 tons, warehouse for Radville Oil Co., Philadelphia: Frank J. Larkin, Philadelphia, general contractor.

183 tons (108 alloy) also 27½ tons reinforcing, Mt. Hood National forest, Oregon; bids to W. H. Lynch, Bureau Public Roads, Portland, Aug. 20.

154 tons, bridge, Sec. 136F-2, Cache, Alexander county, Ill., for state; Illinois Steel Bridge Co., Jacksonville, Ill., low; bids July 26.

134 tons, switchback Coulee dam; Lehigh Structural Steel Co., low at $26,535.

120 tons, electrification poles, Pennsylvania railroad.

Unstated, relift plant, Buffalo Rapids project, Montana, bids Aug. 26; steel warehouse, Coulee project; 15-ton traveling crane for Payette project, Idaho, bids Aug. 26; machine shop for Nyssa, Oregon, bids Aug. 27; to Bureau of Reclamation, Denver.

Unstated, stop logs, valve chamber, Bonneville dam; Schmitt Steel Co., Portland, low $2,320, unit price.

## REINFORCING BARS . . .

### REINFORCING BARS PLACED

3500 tons, Brooklyn-Queens connecting highway, Contract No. 4, through Del Balso

# SPRING FINISHES are more than a *Beauty Treatment..*

That's why Raymond gives this branch of springmaking *extra* attention, with a special department under the supervision of men thoroughly familiar with the use of zinc, cadmium, white nickel, copper dip, Houghto-black and Iridite over cadmium or zinc. Since improper plating can cause brittleness, can even alter dimensions, it should be specified and used with care Raymond gives springs expert attention in *every* detail—a good thing to remember when you choose *your* springmaker.

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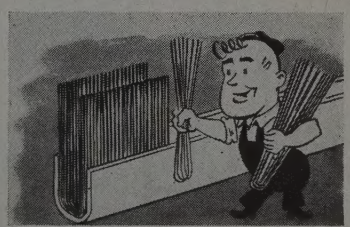
# FULLER-GRIPT BRUSHES

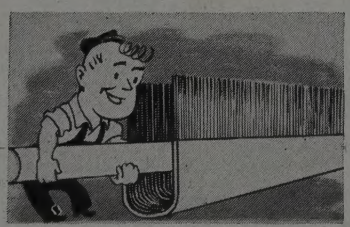
***are made to***

## LAST LONGER

1 A strip of steel, brass or bronze is formed into a channel. This metal may be plated to resist chemical and water corrosion.

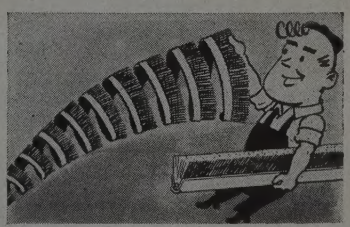


2 Then, filler material of the kind and length to do the job best is "hairpinned" and inserted, ends up, in the channel.



3 Next, a plated steel wire is laid along the channel on top of the filler material to anchor it permanently in position.

4 Finally, the sides of the metal strip are clinched under heavy pressure so that the bristles can never fall out.



5 Fuller-Gript brushes can be wound around cores from 1/4" to 3 ft. in diameter, spiraled, or laid in strips of any length

Fuller-Gript construction not only gives you a brush that lasts longer, but one of uniform density that provides more efficient brushing action. Fuller-Gript brushes can be designed specifically to do any brushing job. Simple anchoring devices make it possible to install them quickly and so securely that they will not come off even when used on high-speed cylinders.

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**Fasten a shelf bracket to a plate glass wall. Eliminate any lateral strain which might cause cracking. Compensate for metal expanding and contracting.**

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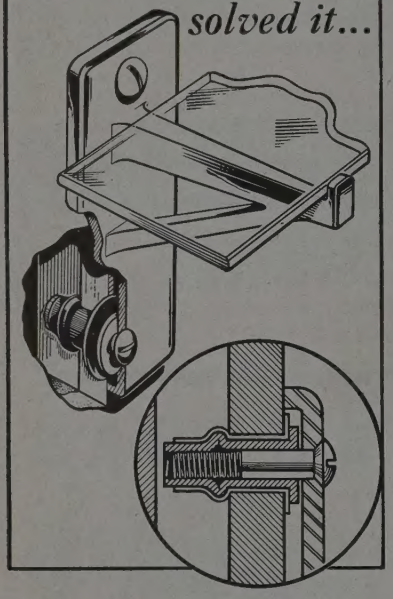

**B. F. Goodrich Rivnuts** with Koroseal sleeves were inserted in drilled holes and upset. The sleeves compensated for expansion and contraction of the metal, keeping the Rivnuts securely anchored. The Rivnuts in turn provided a secure foothold for the attachment screws. Simple solution? Yes. But only because of the unique dual-use feature of B. F. Goodrich Rivnuts. Why not get the whole story and perhaps find the answer to *your* fastening problem?

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RIVNUTS
*It's a rivet—It's a nutplate*

Construction Corp., New York, to Bethlehem Steel Co., Bethlehem, Pa. This is in addition to 3500 tons of H-piling and 330 tons of shapes, also placed with Bethlehem Steel Co.

3200 tons, reinforcing steel, Brooklyn-Battery tunnel approach on Manhattan side, New York City, through Gull Construction Co. Inc., and L. G. DeFelice & Son, to Bethlehem Steel Co., Bethlehem, Pa., which also received 1000 tons of H-piling, in addition to 1050 tons of shapes, recently reported.

110 tons, bridge, Sheldon Springs, Vt., to Truscon Steel Co., Boston; Marson Construction Co., Cambridge, Mass., general contractor.

100 tons, Snake river bridge, Idaho, to Bethlehem Pacific Coast Steel Co., Seattle.

### REINFORCING BARS PENDING

260 tons, Washington state highway girder bridge and culvert; bids to Olympia Aug. 13.

Unstated, warehouse for Grays Harbor Port Commission, Hoquiam, Wash.; bids Aug. 9.

## PLATES . . .

### PLATES PLACED

475 tons, 6600 street light standards, Chicago, for Department of Streets and Electricity; divided between Westinghouse Electric Corp., East Pittsburgh, Pa., and Graybar Electric Co. Inc., New York; bids July 1.

300 tons or more, 120-foot barge for Coulee dam caisson work, to American Bridge Co., Denver, low at $63,866.

300 tons or more, 78-inch diameter penstock for Cedar river water system, Seattle, to Paul Jarvis Inc., Seattle, low at $80,587.

### PLATES PENDING

575 tons, steel face for water reservoir, Grand Junction, Colo.

Unstated, five 3,000-barrel silos with accessories, for Columbia Basin project; bids to Denver, Aug. 28.

Unstated, 12-foot diameter welded penstock, for Cascade dam, Idaho; bids to Denver, Aug. 29; Spec. No. 1451.

Unstated, 70 pontoons; new bids to U. S. engineer, Portland; previous tender of $74,550 by Gunderson Bros., Portland, rejected.

## PIPE . . .

### STEEL PIPE PENDING

5730 tons, 10,000 feet of 16-inch centrifugally cast water pipe, Proposal 98-46, for Department of Public Works, Chicago; U. S. Pipe & Foundry Co., East Burlington, N. J., sole bidder; bids Aug. 5.

1480 tons, centrifugally cast water pipe, Proposal 89-46, for Department of Public Works, Chicago, with bids Aug. 5; U. S. Pipe & Foundry Co., East Burlington, N. J., low on 5000 feet of 6-inch, sole bidder on 50,000 feet of 8-inch, and low on 10,000 feet of 12 inch.

1480 tons, centrifugally cast water pipe, Proposal 90-46, for Department of Public Works, Chicago, with bids Aug. 5; U. S. Pipe & Foundry Co., East Burlington, N. J., low on 5000 feet of 6-inch, and sole bidder on 50,000 feet of 8-inch and 10,000 feet of 12-inch.

1480 tons, centrifugally cast water pipe, Proposal 91-46, for Department of Public Works, Chicago, with bids Aug. 5; U. S. Pipe & Foundry Co., East Burlington, N. J., low on 5000 feet of 6-inch, sole bidder on 50,000 feet of 8-inch, and low on 10,000 feet of 12-inch.

1050 tons, 24-inch, Boston Consolidated Edison Co., Boston.

1020 tons, 20-inch, class C pit-cast, Springfield, Mass.

1000 tons, various sizes, for Kelso, Wash.; general contract to Fred J. Earley Co., San Francisco.

200 tons, various sizes for Pasco, Wash.; bids Aug. 6.

200 tons, 16 and 24-inch, Hartford, Conn.

## RAILS, CARS . . .

### RAILROAD CARS PLACED

Chicago & North Western, 140 seventy-ton covered hopper cars, to Bethlehem Steel Co., Bethlehem, Pa.

Cincinnati Street Railway Co., 45 trolley coaches, to Marmon-Harrington Co., Indianapolis, Ind.

Cleveland Transit System, 150 trackless trolley cars, to St. Louis Car Co., St. Louis.

Delaware & Hudson, 400 fifty-ton gondola cars, to Bethlehem Steel Co., Bethlehem, Pa.

Union Pacific, 1000 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

### RAILROAD CARS PENDING

Atchison, Topeka & Santa Fe, 1750 box cars; purchase authorized; in addition to 750 now on order.

# CONSTRUCTION AND ENTERPRISE

### ARKANSAS

HELENA, ARK.—Helena Cotton Oil Co., Helena, has let contract to Muskogee Iron Works, Muskogee, Okla., for a cottonseed processing plant to cost about $225,000.

### CALIFORNIA

EMERYVILLE, CALIF.—Gardiner Electric Mfg. Co., 4227 Hollis St., has let contract to Dinwiddie Construction Co., San Francisco, for reconstruction of plant building recently burned, to cost about $75,000. Carl S. Replogle, 510 Boulevard Way, Oakland, Calif., is architect.

LOS ANGELES—Harvey Machine Co., 6200 Avalon Blvd., has CPA approval for a plant building at Pacific Blvd. and 46th St., to cost about $80,000.

MAYWOOD, CALIF.—National Automotive Fibres Inc., 6001 Randolph St., has let contract to Alco Construction Co., 5423 Flemish Village Lane, Los Angeles, for a one-story 100 x 465-foot plant building to cost about $275,000. Taylor & Taylor, 803 West Third St., Los Angeles, are architects.

PITTSBURG, CALIF.—Columbia Steel Co. has let contract to American Bridge Co., 564 Market St., San Francisco, for buildings for its cold reduction and tin plate mill, including administration, industrial relations, hospital and sanitary buildings, to cost about $500,000 of the $3 million project.

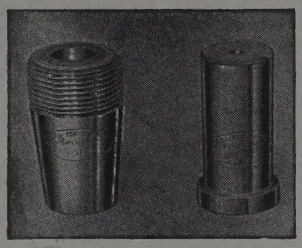
SOUTH GATE, CALIF.—Research Welding Co., 2145½ Florence Ave., Huntington, Calif., has let contract for a one-story shop and office building 50 x 100 feet at 10608 Santa Fe Ave., South Gate, to cost about $20,000.

SOUTH GATE, CALIF.—Herco Co., 2605 East 26th St., Vernon, Calif., has let contract to Shannahan Bros., 6193 Maywood Ave., Huntington Park, for a foundry building 146 x 169 feet, at 5335 Southern Ave., to cost $60,000. W. M. Bostock, 2534 Live Oak St., Huntington Park, Calif., is architect.

VAN NUYS, CALIF.—General Motors Corp. has building permit for a plant building at 7800 Van Nuys Blvd., 610 x 900 feet, to cost about $4 million.

WILMINGTON, CALIF.—Republic Supply

# WHEREVER BLASTING IS DONE!



Wherever there is blast cleaning there ought to be a Federal Blast Nozzle. Made of cast tungsten-carbide (the hardest metal known to man) the Federal Blast Nozzle concentrates the blast, reduces air costs and outwears any nozzle previously offered for the purpose.

Being cast, the tungsten-carbide is pure—as is not the case when made by sintering.

The purity of the metal ensures long wear, reduces air consumption and guarantees concentration of the blast—all due to the extremely slow wear of the orifice.

Made in several sizes; adapters can be furnished to fit all makes of blasting equipment.

The Federal Foundry Supply Company

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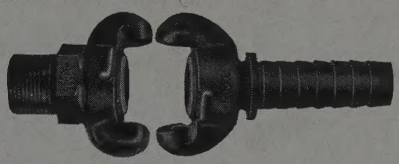
## TROJON AIR HOSE COUPLINGS
## MALLEABLE IRON — RUST-PROOF



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QUICK-ACTION—Instantly connected or disconnected with one quarter turn.

TIME TESTED — DEPENDABLE. Manufacturer of these couplings since 1921.

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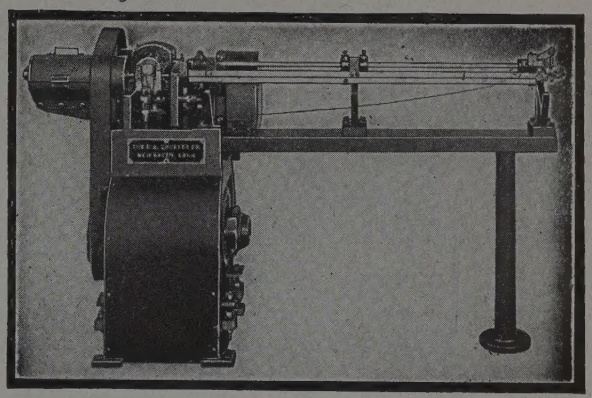

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## GREATER PRODUCTION!

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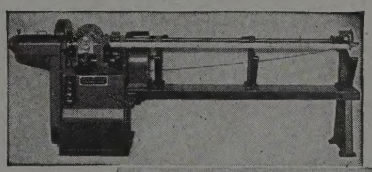
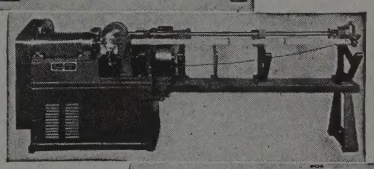
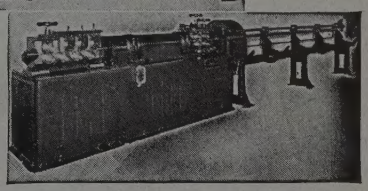


Type 1A
1/16"—3/16"
Dia.



Type 2A
⅛"—¼"
Dia.



Type 3A
3/16"—3/8" Dia.
Type 4A (not shown)
3/8"—5/8" Dia.

**The F. B. Shuster Mfg. Co., Inc., New Haven, Conn.**

# SHUSTER
*Automatic*
WIRE STRAIGHTENING
AND CUTTING
MACHINES
*Since 1866*

Co., 607 West B St., has let contract to Buttress McClellan, Los Angeles, for a warehouse and office building 100 x 180 feet, to cost about $80,000. Jack MacDonald, 1013 East Eighth St., Los Angeles, is architect.

## FLORIDA

BARTOW, FLA.—International Minerals & Chemicals Corp., 20 North Wacker Dr., Chicago, plans a phosphate processing plant here, estimated to cost $2,680,000.

## ILLINOIS

CHICAGO—General Fibre Co., 3100 South California Ave., has let contract to Carl Erickson Co., 4753 Broadway, to cost about $100,000.

CHICAGO—Rheem Mfg. Co., 3700 South Kedzie Ave., has let contract to Poirot Construction Co., 2001 West Pershing Rd., for a one-story plant addition to cost about $300,000.

DES PLAINES, ILL.—Aluminum Co. of America, 520 North Michigan Ave., Chicago, plans early erection of an aluminum die casting plant at Wolf and Algonquin Roads.

EAST PEORIA, ILL.—Caterpillar Tractor Co., 600 West Washington St., Peoria, Ill., has let general contract to S. N. Nielson Co., 2059 Augusta Blvd., Chicago, for substructure of a one-story 750 x 1110-foot reinforced concrete and steel building for its engine plant. Giffels & Vallet Inc., Marquette Bldg., Detroit, are architects. Cost is estimated at over $1 million.

EFFINGHAM, ILL.—Norge Stove Division of Borg Warner Corp. has let contract to C. J. Moritz Inc., for erection of a plant addition costing about $55,000, adding about 55,000 square feet for expansion of operations.

## LOUISIANA

SHREVEPORT, LA.—United Gas Pipe Line Co., 1524 Fairfield St., Shreveport, is taking bids on natural gas pipe line extensions in Louisiana, Mississippi and Texas, to cost over $1½ million.

## MICHIGAN

CENTERLINE, MICH.—Kotcher Tool & Engineering Co., 23801 Mound Rd., has been incorporated with $50,000 capital to manufacture tools, by Edwain H. Kotcher, 19450 Shrewsbury St., Detroit.

DETROIT—Michigan-Wisconsin Pipe Line Co., care Michigan Consolidated Gas Co., 415 Clifford St., Detroit, plans a 1285-mile 26-inch natural gas line from Pampa, Tex., to Detroit, to cost about $70 million, of which pipe will cost about $20 million.

DETROIT—Associate Tool Corp., 5576 Balfour St., has been incorporated with $75,000 capital to manufacture machine tools, dies and fixtures, by John G. Hurner, same address.

DETROIT—Romada Tool & Mfg. Co., 9536 Dearborn St., has been incorporated with $25,000 capital to do a general machining and die casting business, by Anthony P. Romanauski, 7289 Hipp, Dearborn, Mich.

DETROIT—Hyde Spring & Wire Co., 2500 David Stott Bldg., has been incorporated with $100,000 capital to manufacture wire, springs and wire products, by Jane Hyde, 6110 Neckle St.

DETROIT—Bond Industries Corp., 7012 Michigan Ave., has been incorporated with $20,000 capital to manufacture machinery, tools and hardware, by John W. Koos, 12740 South Morrow Circle, Dearborn, Mich.

DETROIT—R. D. Fageol Co., 5725 Mt. Elliott Ave., has been incorporated with $46,100 capital to manufacture governors, carburetors, degassers, etc., by F. R. Fageol, 850 West Main St., Kent, O.

DETROIT—Eagle Production Co., 2126 Howard St., has been incorporated with $33,000 capital to manufacture tools and automotive parts, by Enid Murphy, same address.

GRAND RAPIDS, MICH.—Wolverine Coil Spring Co., 818 Front St., has been incorporated with $50,000 capital to manufacture coil springs, by Raymond F. Carlberg, same address.

GROSSE ISLE, MICH.—Karmazin Products Corp., 19525 Park Lane, has been incorporated with $250,000 capital to manufacture evaporators, condensers and unit heaters, by John Karmazin, same address.

MARSHALL, MICH.—Woodlin Metal Products Co., 900 South Marshall Ave., has been incorporated with 15,000 shares no par value to fabricate sheet metal parts, by Walter H. Woodhama, RFD N. 1, Marshall.

MT. PLEASANT, MICH.—Stevens Mfg. Co., 415 East Picard St., has been incorporated with $110,000 capital to do welding work, by Frank E. Stevens, 1023 South Main St.

TRENTON, MICH.—Cycleweld Division of Chrysler Corp. has let contract to O. W. Burke Co., 1032 Fisher Bldg., Detroit, for a plant building estimated to cost about $150,000.

WASHINGTON, MICH.—Washington Machine & Stamping Co. has been incorporated with $50,000 capital to do general manufacturing, by George C. Waschull, Washington.

## MISSOURI

ST. LOUIS—Sterling Aluminum Products Co., 2925 North Market St., has let contract to John Hill Construction Co., 1228 Syndicate Trust Bldg., for a one and two-story shop and warehouse building, to cost about $50,000, with equipment.

## NEW YORK

BUFFALO—Niagara Machine & Tool Works, 683 Northland Ave., has let contract to Shirley-Herman Co. Inc., 1807 Elmwood Ave., for a forge and heat treating shop addition, to cost over $100,000.

## NORTH CAROLINA

CHARLOTTE, N. C.—Southeastern Broadcasting Co., station WBT, Wilder Bldg., Charlotte, is taking bids on a 500-foot tower at Spencer Mountain, N. C., to cost about $250,000.

## OHIO

ASHTABULA, O.—Timken-Detroit Axle Co., 100 Clark Ave., Detroit, will build on a 45-acre site a 150 x 400-foot plant for manufacture of automobile brakes and related equipment. Walter F. Rockwell is president of the company.

ASHTABULA, O.—Craftmaster Mfg. Co. has been incorporated to manufacture garage equipment and machinery and has leased a plant at 412 West 48th St., which will be remodeled and equipped. Melville Sears is manager.

CANTON, O.—Notnac Mfg. Co. has been incorporated with $10,000 capital to manufacture custom electrical equipment by Glenn E. Manard, 4721 Tuscarawas St.

CLEVELAND—Norwood-King Corp. has been incorporated to manufacture parts for textile machinery, by J. Wilbur Corry, 1128 Standard Bldg., statutory agent.

CLEVELAND—Atlas Thermostat Co. has been incorporated by L. S. Berne, secretary of Hotstream Heater Co., 2363 East 69th St., to manufacture thermostats, control and safety valves.

CLEVELAND—Howald Metal Products Co. has been formed by William J. Howald, 21591 Lake Shore Blvd., and will establish a sheet metal shop near East 185th St.

CLEVELAND—Perfection Stove Co., 1135 Ivanhoe Rd., Donald Smith, treasurer, has expansion plans to cost $4 million to enlarge facilities for manufacture of steel furnaces and unit heaters. An addition to the Ivanhoe Rd. plant will cost about $2 million.

CUYAHOGA FALLS, O.—Fair Mfg. Co., recently incorporated to manufacture metal stampings and products, is located temporarily at 2658 Hawthorne Rd. and plans to build a plant soon. A. J. Talmadge is president.

HARTVILLE, O.—Cleveland Tapping Machine Co., 3610 Superior Ave., Cleveland, W. R. Harrison, president, has bought six acres near here for a one-story 100 x 100-foot manufacturing building to which operations will be removed, for manufacture of automatic tapping machines.

## OREGON

PORTLAND, OREG.—Dulien Steel Products Co., Seattle, has bought a 10-acre site at Guilds Lake, formerly occupied by Hyman-Michaels Co.

## PENNSYLVANIA

PHILADELPHIA—Quaker City Iron Works, Allegheny Ave., has let contract to Jack S. Steele Co., Commercial Trust Bldg., for a manufacturing building estimated to cost over $55,000.

PHILADELPHIA—Dilt & Collins Division of Mead Corp., paper manufacturer, Richmond and Tioga Sts., plans a paper plant to cost about $5 million. George F. Hardy, 441 Lexington Ave., New York, is consulting engineer.

## TEXAS

DALLAS, TEX.—Hollister Coil Spring Mfg. Co., 2932 Commerce St., plans factory building at Singleton Blvd., to cost about $125,000. Blocker & Hundley, 2912 Hall St., are architects.

HOUSTON, TEX.—Tennessee Gas & Transmission Co., Commerce Bldg., Houston, plans laying of 95 miles of 16-inch transmission in Hidalgo county, to cost about $2,200,000.

## VIRGINIA

FREDERICKSBURG, VA.—Sylvania Industrial Corp. has let contract to Hughes-Foulkrod Co., 1505 Race St., Philadelphia, for a plant addition to cost about $75,000. Ballinger Co., 105 South Twelfth St., Philadelphia, is architect.

## WASHINGTON

RIDGEFIELD, WASH.—City plans sewage treatment plant to cost about $87,000, in connection with proposed sewer system. General Engineering Co., Seattle, is engineer.

VANCOUVER, WASH.—R. G. Lovett, city clerk, will receive bids Aug. 21 for machinery and equipment for a primary sewage treatment plant to cost about $100,000, half for equipment. Marvin E. Ray is city engineer.

## WISCONSIN

KENOSHA, WIS.—Dynamatic Corp., 3307 Fourteenth Ave., has let contract to Lindermann Construction Co., 4708 Fifth Ave., for a one-story plant addition, estimated to cost about $300,000. G. S. Rider & Co., Terminal Tower, Cleveland, is engineer.

MILWAUKEE—International Harvester Co., 1714 West Bruce St., has let contract to Permanent Construction Co., 4100 West Third St., for a sand tower and foundry addition to cost about $100,000. E. N. Potter, care owner, is engineer.

## WYOMING

CASPER, WYO.—Texas Co., Casper, plans a crude still unit and plant for manufacturing road oils and asphalt products, estimated to cost about $3 million; fluid catalytic cracking and gas recovery unit, also estimated at $3 million.